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Total BOOKS/CONFERENCE for the calender year 2019	**11**

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Multi-Criteria Ranking of Best Management Practices for Flood Reduction in Kochi City, Kerala

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***Abstract*— This paper focuses on the flood management strategies which are appropriate for Kochi while considering water conservation aspects. Best Management Practices (BMP), the structural and non structural measures, to manage the quantity and improve the quality of storm water in cost effective manner were reviewed. The BMPs like permeable pavers, Rain barrels and infiltration trenches were analyzed for their hydrological performances using the Storm Water Management Model (SWMM) by US EPA. The present study applies a multi criteria analysis (MCA) namely analytical network process (ANP) to rank the BMPs for flood reduction in the city. MCA makes it possible to tradeoff various other criteria that can bring about sustainability element to the solution. The ranking was obtained considering multiple stakeholders like people, design engineers and policy makers.**

***Keywords*— Flood reduction, Best Management Practices, Multi Criteria Analysis, SWMM, Analytical network Process**

I. INTRODUCTION

Kochi, the most populated city in Kerala, is one of the 20 selected smart cities in India. The city is transforming from early-urban to middle urban stage [1]. Even at this growth stage, Kochi lacks sufficient drainage and sewerage system. The storm water in Kochi is managed through natural inland canals and secondary man made drains, constructed even without considering the actual runoff. Lack of sewerage network causes the households to use storm drains for sewage discharge thereby contaminating and clogging the drainage network of city. Any blockage in these open drains or canals results in inundation of the surrounding area with sewage mixed storm water. On the other side, the city is under acute water scarcity due to contaminated ground water and mostly unreliable and insufficient supply through pubic distribution network [2]. Therefore, managing large volume of storm water without flooding while utilizing it as a resource to enhance urban water security is of prime importance to Kochi.

The present work evaluated some of the Best Management Practices (BMP) [3] for storm water management such as rain barrels, infiltration trench, pervious pavements and permeable interlocking pavements. A ranking of BMPs or their combinations were carried out using multi-criteria analysis (MCA) based on technical, social, economic and environmental criteria with focus on flood reduction and harvesting of rainwater in the urban area.

II. STUDY AREA

49 sq. km of eastern Kochi divided into 137 sub catchments was considered in the present study. Catchments were selected such that they are bounded by water bodies on all sides. Overflow effects from the upper catchments are therefore avoided in such hydrologically isolated catchments. The study area and the catchment subdivision are given in figure 1. A drainage map of the study area, was prepared from the ground contour (created using SRTM- DEM) and inland water way map, as shown in figure 2.

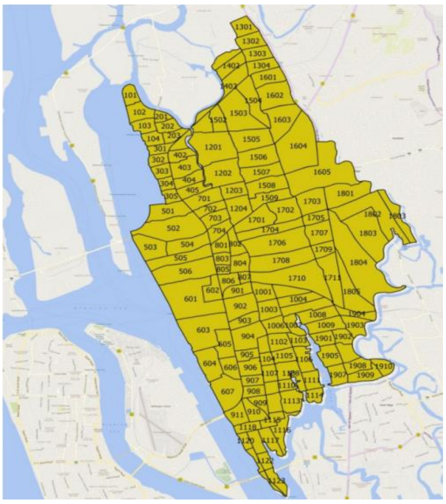

Figure 1 - Catchment area and its subdivisions.

Figure 2 also shows problematic area with 500 m buffer zone created for finding out the weightage factor for problematic area nearness. The nodes coming under these buffer zones are more significant in causing flood problems to the public compared to the other areas.

Study of the Extent of Contribution of Regional Stubble Burning to the Air Pollution in Delhi-National Capital Region

A&WMA's 112th Annual Conference & Exhibition
Québec City, Québec
June 25-28, 2019

Paper 594032

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ABSTRACT

The issue of extreme episodic air pollution events in the Delhi-National Capital Region (NCR), India, during the month of November has been of concern for the last few years. Recent studies have used satellite observations and transport models, which indicate movement of smoke from stubble burning regions in Punjab and Haryana towards Delhi. Quantification of contribution of these emissions to the air pollution in Delhi, however, remains uncertain. In the present study, a similar attempt was made, and measurements are reported from 16 ground-based continuous air quality monitoring stations (CAAQMS) in the Delhi-NCR for the years 2016 and 2017. Time series $PM_{2.5}$ ground measurements were compared with the total Fire Radiative Power (FRP) from Moderate Resolution Imaging Spectroradiometer (MODIS) onboard Terra and Aqua satellites for the airshed for Delhi-NCR. To quantify the smoke contribution from the fire pixels to the Delhi-NCR, the Navy Aerosol Analysis Prediction System (NAAPS) smoke data were used. NAAPS simulations show that the smoke aerosol contribution to Delhi-NCR from stubble burning was ~5-10 $\mu g/m^3$ during the pollution episodic days in 2016. NAAPS results along with the $PM_{2.5}$ measurements at Ludhiana, Punjab, indicate that the stubble burning emissions may contribute 33-66 $\mu g/m^3$ to the $PM_{2.5}$ at Delhi depending on wind conditions and emission levels at the source. The predominant aerosols over the study area during the episodic period were verified to be

Monitoring and Analysis of Gas Emissions from a Closed Landfill Site at Jleeb in Kuwait

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Paper # 601336

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ABSTRACT

Lack of monitoring for landfill gas (LFG) emissions increases the hazard risk especially when a landfill site is being developed for further uses. This paper discusses the results from a LFG monitoring study carried out at a closed landfill site in Kuwait which lack engineered gas collection and venting system. Jleeb Al Shuyoukh landfill site was active between 1970 and 1993. The composition and seasonal variations in LFG release were monitored at Jleeb landfill site using Gasclam for the continuous LFG monitoring at 4 boreholes during the period July 2018 – Feb 2019. The monitored gases included methane (CH_4), carbon dioxide (CO_2), Carbon Monoxide (CO), Volatile Organic Compounds (VOCs), Hydrogen Sulphide (H_2S) and Oxygen (O_2). The concentration of these gases in %v/v was monitored at 1 hour interval for the entire study period along with atmospheric pressure, borehole pressure and temperature. Consistent methane release with a concentration of 40- 65 %v/v was observed at the boreholes constructed for this study. Among the monitored gases only CO_2 showed a positive correlation with methane. A constant CH_4/CO_2 ratio and lack of correlation with H_2S indicated that the landfill is in stable phase. Lack of correlation between methane release and the bore hole pressure as well as ambient temperature

Controllability studies on fish-shaped unmanned under water vehicle undergoing manoeuvring motions

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Controllability studies on fish-shaped unmanned under water vehicle undergoing manoeuvring motions

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ABSTRACT: Bio-inspired propulsion systems have many advantages over the conventional ones. They are found to be noiseless and eco-friendly. Most of the aquatic locomotion makes use of oscillations, paddling and water-jet for producing net thrust on the body. In this paper a box-fish shaped unmanned underwater vehicle (UUV) has been considered for studying its controllability. A RANS based CFD method has been implemented for simulating manoeuvring motions in heave and pitch to obtain the forces and moments during such motions.

1 INTRODUCTION

Bio-inspired propulsion is a much researched field these days. The fact that, the noise and vibrations produced during the operation of conventional propellers have adversely affected the bio-diversity of oceans, has made bio-inspired propulsion more enticing to mankind. Getting rid of the conventional rotary components of a propulsion system completely is also not practical. Ocean transport do contribute to a mammoth scale of world's economy. Hence there should be a balance between bio-inspired flapping foil as well as the conventional propulsion systems so that we do not tamper much with the ecological systems and at the same time do contribute to the economy.

Nature is known as the master engineer. The efficiency of propulsion of some aquatic animals have struck us in awe and the values of their efficiency have far outperformed those of man-made vehicles. Now it is time to have a few such vehicles operating in the oceans. There have been many studies in the past decades concentrating on the flapping foil mechanisms on ocean vehicles: both surface and sub-sea. Most of them focused on the determination of propulsive efficiency while others on the controllability.

1.1 *Understanding the locomotion of fish*

The locomotion of the fish is indeed complex yet efficient. Various fins involved in the locomotion or swimming are shown in Figure 1.

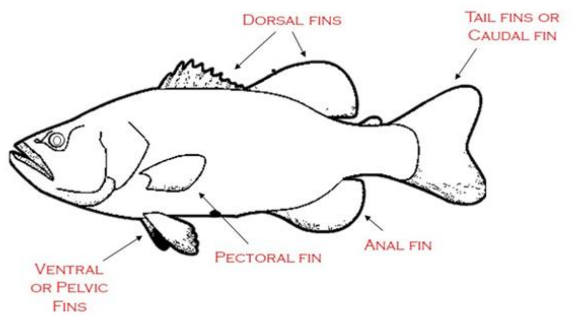
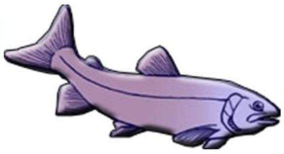


Figure 1: Various fins on the body of a fish

Fishes swim using all the fins. The locomotion a fish swimming with tail fin or the caudal fin and the trunk is broadly classified into angulliform, subcarangiform, carangiform, thunniform and ostraciiform (Figure 2). From angulliform to ostraciiform the locomotion gets simplified with the deteriorating involvement of the trunk as the undulations of the entire trunk reduces to mere oscillations of the tail during swimming. Locomotion of the fish with varying involvement of the trunk and tail is shown in Figure 3.

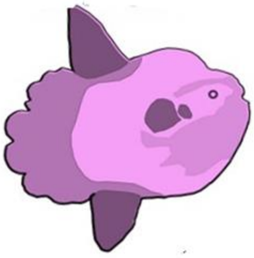
In ostraciiform models, the undulation is confined mostly to the caudal fin without moving the body. The thrust for this model is generated with a lift-based method, allowing cruising speeds to be maintained for long periods. This form is considered to be the sim-

(a) Angulliform (eel)



(b) Carangiform (salmon)

(c) Thunniform (tuna)



(d) Ostraciiform (sunfish)

Figure 2: Fish with different types of tail locomotion

plest of all for carrying out mathematical studies. A UUV with hull form geometrically similar to that of a box-fish, a typical ostraciiform model undergoing manoeuvring motions in heave and pitch, has been analysed for controllability in the present study. UUVs also known as underwater drones are vehicles with no humans onboard during the course of their mission. There are basically two types of UUVs- autonomous underwater vehicle (AUV) and remotely operated vehicle (ROV). AUVs are more or less like robots not entailing human intervention throughout their mission while ROVs are remotely operated from a ground station.

In the case of present work, the vehicle's hull form is more important than its mode of operation. Guidance and control are very important aspects in the design of marine vehicles no matter whether they are surface or underwater vehicles. A motion planning and control system was developed for autonomous surface vehicles by Hinostroza, Guedes Soares, & Xu 2018. This work aims at achieving the first step in controllability predictions-determination of forces and moments during manoeuvring motions. A linear mathematical model combined with a RANS based CFD method has been used for obtaining the thrust generated during the oscillatory motions of the tail with ANSYS FLUENT as the solver. The forces and moments acting on the hull form in both static and dynamic manoeuvres have been estimated. This paper is an initial step towards the controllability and stability prediction of fish-shaped UUVs which could be used in search and rescue as well as surveillance missions. Hence it is imperative to predict the trajectory of such vessels well in advance through controllability studies of its hull form.

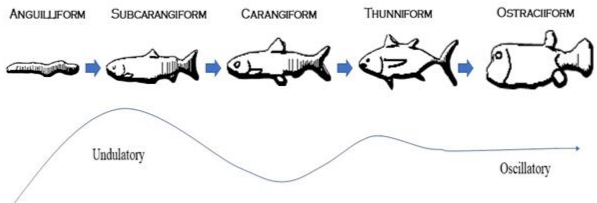


Figure 3: Undulatory motion of the entire trunk to oscillatory motion of the tail

It is quite evident that the ostraciiform type of locomotion is the simplest mode of locomotion. A design based on this type of locomotion will be obviously the most feasible for a UUV. The studies on ostraciiform type of locomotion was reported by Blake 1977. The study made some interesting observations. For slow progression, the caudal fin inclination with the longitudinal axis of the body is about 3 to 6 deg while for fast progression, the angle is 35 deg. 3-D manoeuvring studies were carried out on a fish-like robot by Wu, Yu, Su, & Tan 2014. The robotic fish here was fabricated using multi-link joints to obtain the agility during swimming and hence better manoeuvrability. The present study considers the controllability aspects of a box-fish by numerically simulating the manoeuvring motions.

Not much work has been reported on the determination of hydrodynamic derivatives of the body form for assessing the vesselś controllability. This paper presents a method for numerically evaluating the hydrodynamic forces and moments-an initial step towards the estimation of hydrodynamic derivatives and thereby the controllability of a box-fish shaped underwater vehicle.

2 UUV GEOMETRY

A box fish in its three dimensional configuration is shown in Figure 4. The principal particulars of the fish are given in Table 1.

Table 1: Principal particulars of the UUV

Dimension	Size (metres)
Length (L)	1.3
Breadth (B)	0.5
Depth (D)	0.5

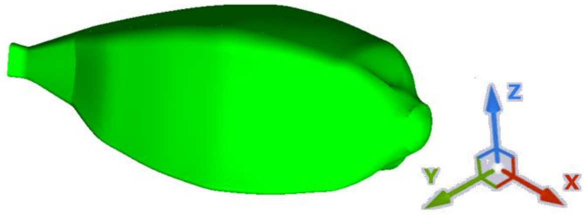


Figure 4: Three dimensional representation of the box-fish shaped UUV

3 MATHEMATICAL MODEL

The Cartesian co-ordinate system of the UUV is shown in Figure 5. The conventional North-East-Down (NED) system is followed here.

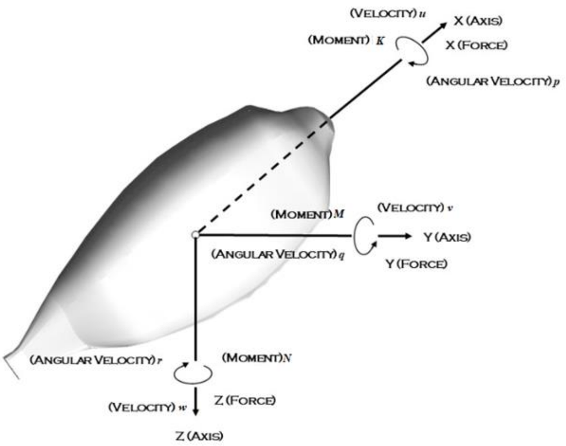


Figure 5: Co-ordinate system used in the study

A linear mathematical model describing the manoeuvring motions of the UUV is represented by Equations (1) through (6)

$$X = X_{\dot{u}}\dot{u} + X_{u|u|}u^2 + X_w w + X_q q + X_\delta \delta + X_T \quad (1)$$

$$Y = Y_{\dot{v}}\dot{v} + Y_v v + Y_p p + Y_r r + Y_\delta \delta \quad (2)$$

$$Z = Z_{\dot{w}}\dot{w} + Z_w w + Z_u u + Z_q q + Z_\delta \delta \quad (3)$$

$$K = K_{\dot{p}}\dot{p} + K_p p + K_v v + K_r r + K_\delta \delta \quad (4)$$

$$M = M_{\dot{q}}\dot{q} + M_q q + M_w w + M_u u + M_\delta \delta \quad (5)$$

$$N = N_{\dot{r}}\dot{r} + N_r r + N_v v + N_p p + N_\delta \delta \quad (6)$$

where subscript T represents thrust and δ, the rudder angle.

4 NUMERICAL EVALUATION OF CONTROLLABILITY IN VERTICAL PLANE

4.1 *Numerical Modelling and Meshing*

For studying the hydrodynamic forces and moments on the UUV during manoeuvring motion there are two basic methods, viz. numerical and experimental. While experimental methods involve prohibitively expensive and rare facilities, numerical methods offer the ease of bringing tedious tasks to desks. However numerical methods have not yet become self sufficient to completely replace experiments. They definitely offer promising inputs to the conceptual design. In this paper an attempt has been made to simulate the manoeuvring motions in the vertical plane of the UUV's motions.

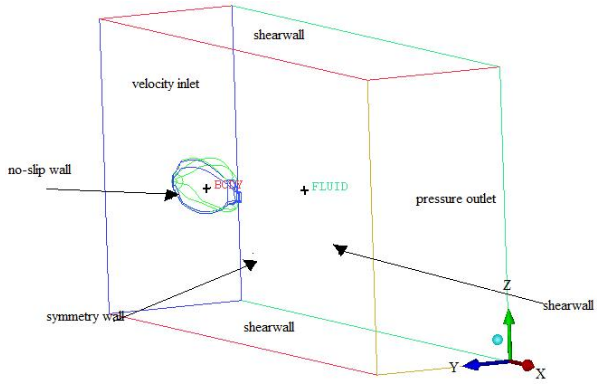


Figure 6: Computational domain with its boundaries

Geometric modelling and meshing has been carried out using the commercial package ANSYS ICEM CFD. Figure 6 shows the computational domain. Its extends are $2.0L \leq x \leq 5.0L$, $2.0L \leq y \leq 2.0L$ and $0 \leq z \leq 2.0L$.

An unstructured meshing strategy is employed here. The minimum cell size has been calculated following the method described by Chandran, Janardhanan, Menon, et al. 2018.

Boundary layer thickness and the near wall element size have been calculated from boundary layer theory. The thickness of laminar sub-layer is obtained from Equation (7) (Schlichting & Gersten 2016).

$$\delta' = \frac{11.6v}{V^*} \quad (7)$$

where V^* is the frictional velocity given by Equation (8)

$$V^* = \sqrt{\frac{\tau_0}{\rho}} \quad (8)$$

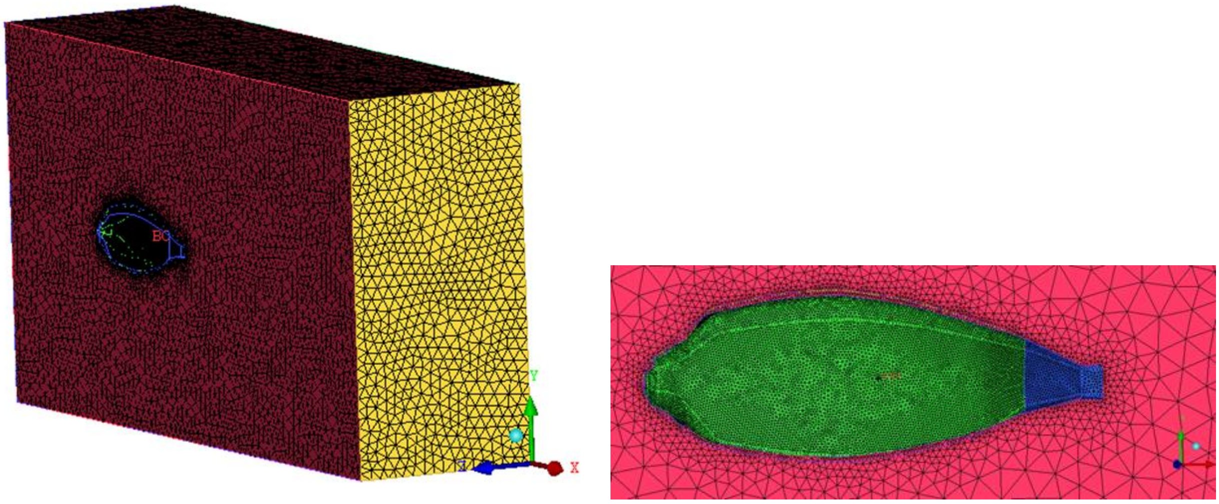
and τ_0 , the wall shear stress, is obtained as in Equation (9).

$$\tau_0 = \frac{0.664}{\sqrt{Re_L}} \cdot \frac{\rho V^2}{2} \quad (9)$$

where, V is the flow velocity and Re_L the length based Reynolds number.

The mesh generated in the computational domain in shown in Figure 7(a). The magnified view around the fish body is shown in figure 7(b).

A velocity corresponding to $Re = 0.5 \times 10^6$ is imposed on the velocity inlet. The outlet is considered to be a pressure outlet. Half-fish model is used with the plane holding mid x-y plane as a symmetry wall. Non-slip boundary condition is assigned to the UUV body and slip walls to the far-field.



(a) Mesh in the domain

(b) Magnified view around the UUV body

Figure 7: Unstructured mesh for computation

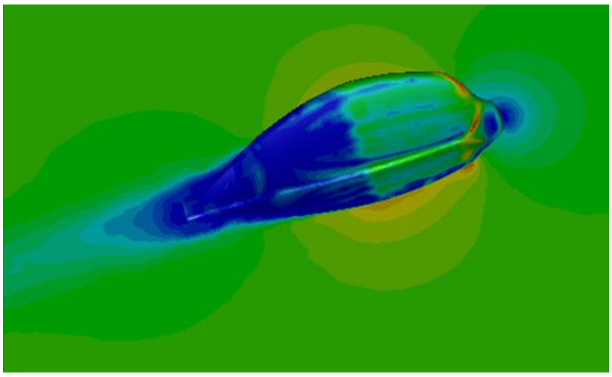


Figure 8: Dynamic pressure contours on the half-UUV

4.2 *Steady-state predictions*

Steady simulations are carried out with $k-\omega$ SST two equation model. PISO scheme is used for pressure velocity coupling. The convergence criteria is set to 10^{-7}. The simulations have been carried out using ANSYS FLUENT version 18.1. Dynamic pressure contours on the half-fish model is shown in Figure 8.

4.3 *Static manoeuvre simulations*

As the 3D simulations were time consuming, for faster predictions, a cut section of the UUV in the 2D plane is used for further analysis. The coefficients of drag (C_D) and lift (C_L) obtained from 3D simulations discussed in the previous section have been used as the reference. The challenge in 2D CFD simulations to yield results close to 3D simulations lies in defining the reference value in the third dimension. As this value remains constant and doesn't consider the variation in the geometry of the model, 2D computations provide only approximate values. Nevertheless, these computations provide enough insights into the flow physics as well as hydrodynamic forces and moments in the initial phase of any design.

Simulations have been carried out by varying the drift angle (β) from 0 to 12.5 deg in the vertical plane. The velocity contours around the UUV obtained from the simulation are presented in Figure 9. Figures from 9 (a) to 9 (f) represents different contours for various drift angles.

4.4 *Propulsion Tests*

Propulsion tests have been carried out on a 2D model through prescribed rigid body motions on the tail using the displacement function given by Equation 10

$$\phi = -\phi_a \sin(\omega t) \tag{10}$$

through the user defined functions (UDF) module of the solver.

Here ϕ is the sinusoidal tail oscillation about y-axis, ϕ_a the amplitude of motion taken here as 12.5 deg, ω is the angular frequency, 0.5 rad/s and t, the instantaneous time. The wake oscillations indicating the effective production of thrust is depicted in Figure 10.

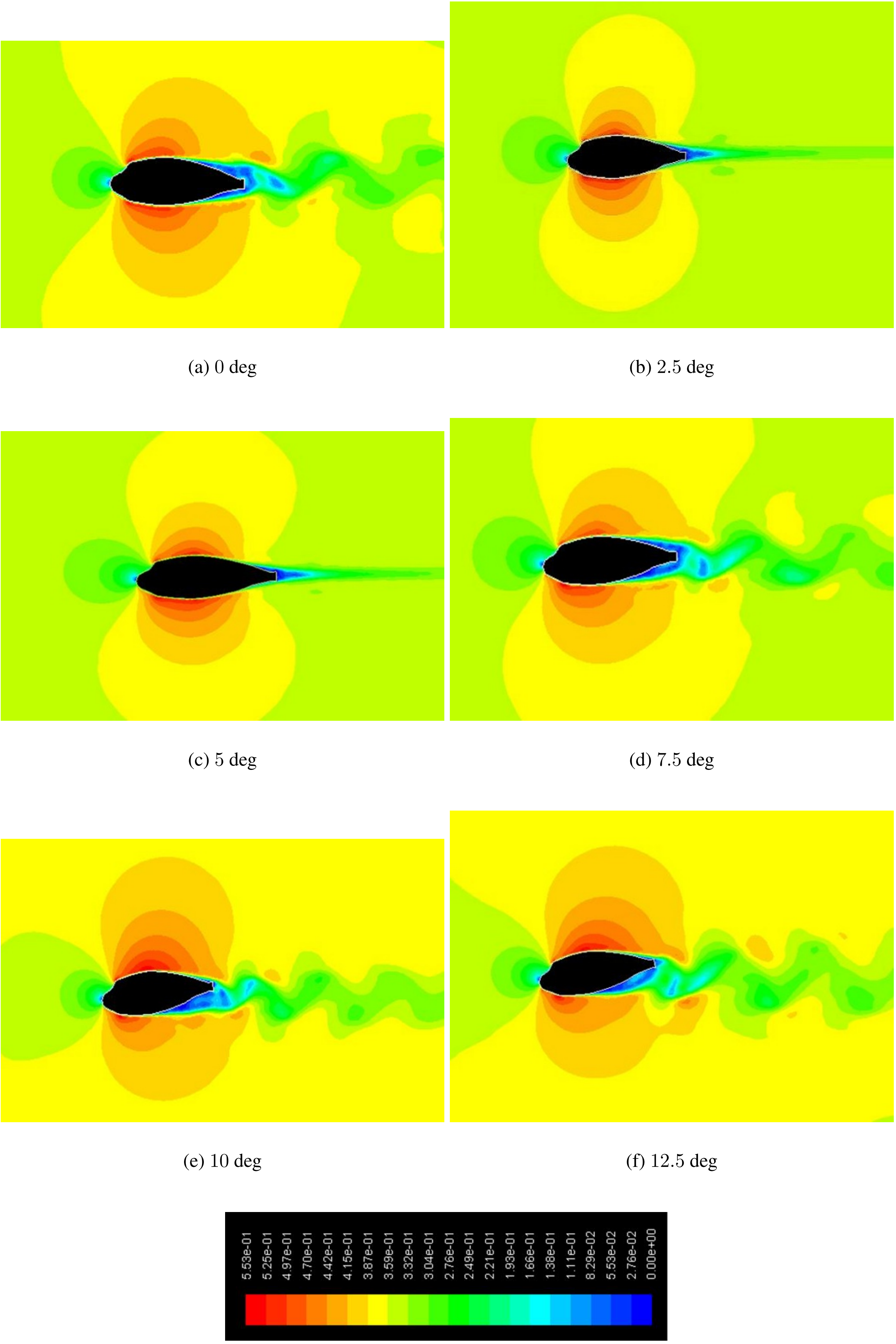
4.5 *Dynamic manoeuvre simulations*

Hydrodynamic forces and moments are predicted here by simulating the manoeuvring motions in heave and pitch. Roll motions are not considered.

The sinusoidal motions in heave and pitch have been brought in using UDF module of the solver. The displacement functions in pitch and heave are as given by Equations 10 and 11 respectively.

$$z = z_a \sin(\omega t) \tag{11}$$

Here z_a is taken as $D/4$. Simulations have also been carried out imposing combined heave and pitch on the UUV body. Contours of total pressure around the UUV body in heave, pitch and combined motions are shown in Figures 11, 12 and 13 respectively.



(a) 0 deg

(b) 2.5 deg

(c) 5 deg

(d) 7.5 deg

(e) 10 deg

(f) 12.5 deg

(g) Velocity Range

Figure 9: Velocity contours around the UUV at various angles of attack.

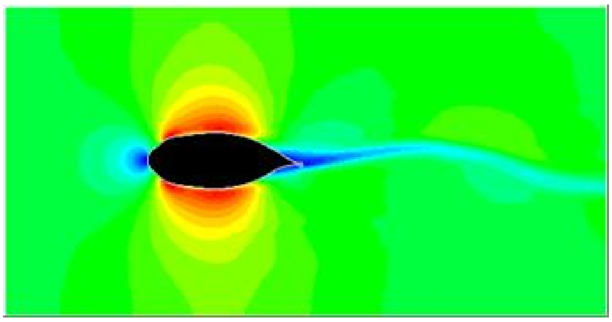


Figure 10: Wake oscillations due to tail motions

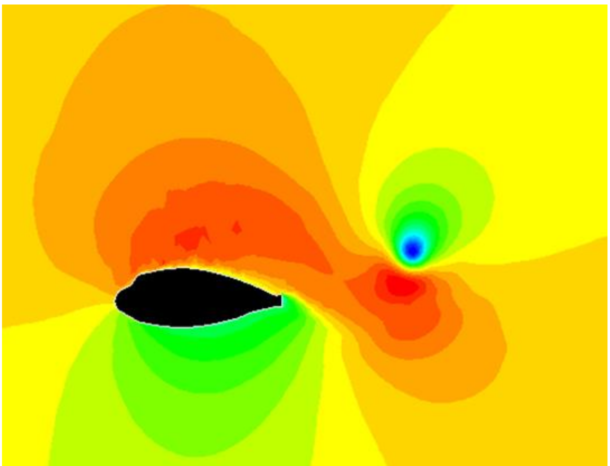


Figure 11: Total pressure contours in heave

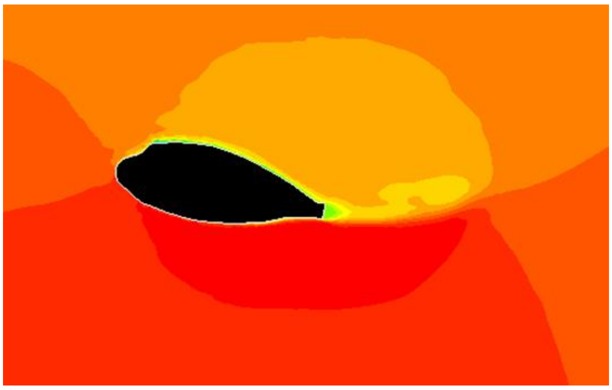


Figure 12: Total pressure contours in pitch

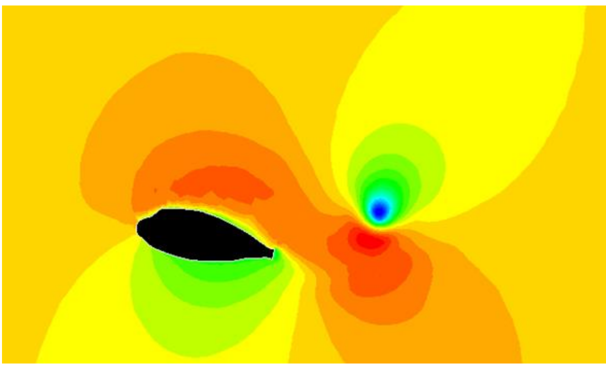


Figure 13: Total pressure contours in combined mode

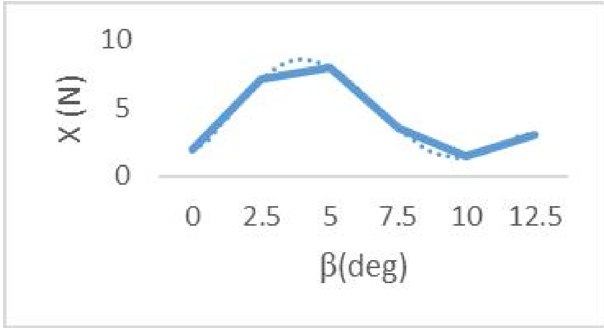


Figure 14: Variation of surge force with angle of attack

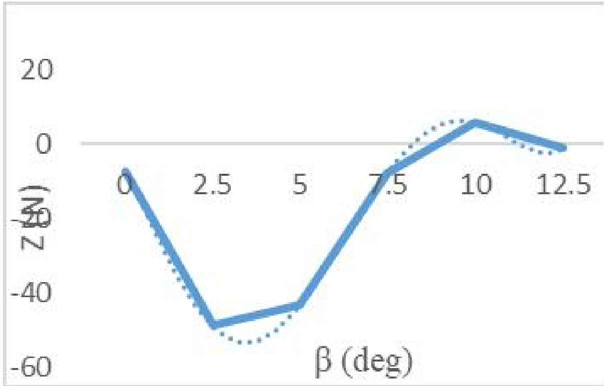


Figure 15: Variation of heave force with angle of attack

5 RESULTS AND DISCUSSIONS

In the present work manoeuvre motion simulations have been carried out on an ostraciiform locomotion inspired box-fish shaped UUV. At the outset, steady state simulations were carried out on a half model of the UUV for $Re = 0.5 \times 10^6$. The simulation yielded the value of drag coefficient, C_D as 0.019 and lift coefficient, C_L as 0.0684. The 2D simulations with an approximation of the third side yielded $C_D = 0.021$ and $C_L = 0.074$. The results show that 2D simulations can yield better results. Net surge and heave forces have been estimated using the Equations (12) and (13) respectively. As there are not much literature on this study, the results could not be verified.

$$X = F_D \cos\beta + F_L \sin\beta \quad (12)$$

$$Z = -F_D \sin\beta + F_L \cos\beta \quad (13)$$

Variation of the surge force, heave force and pitch moments with the angle of attack, β are shown in Figures 14, 15 and 16 respectively. The plots are also supplemented by a smoothing trend line.

The prediction of hydrodynamic forces and moments in the case of box-fish like bodies is not as straight forward as in the case of streamlined ships and submarines. The body being bluff, sheds vortices at moderate angles (say 7.5 deg) of attack which shows a sudden drop in surge and heave forces as well as in pitch moment. Later beyond 10 deg, the formation of vortices stabilizes and are expected to contribute to induced components of surge, heave and

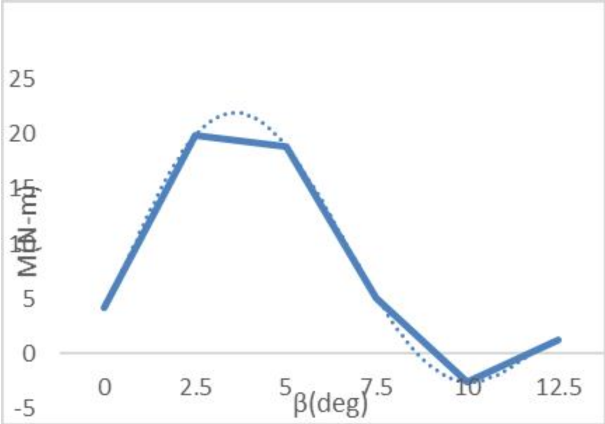


Figure 16: Variation of pitch moment with angle of attack

pitch and hence a rise in the trend is seen.The static manoeuvre simulation tests on further analysis provide the w dependent derivatives.

The propulsion simulation using the oscillation of the tail show an oscillating wake with very weak vortices shedding and disappearing in no time. Hence ostraciiform fish exhibits sluggish locomotion. The maximum thrust generated due to tail motion is found to be $X_T = 2.4N$.

Time histories of surge force, heave force and pitch moment when the UUV is subjected to pure sinusoidal heave motion is shown in Figure 17 plotted for one complete time period of oscillation ($12.56rad/s$).

Similarly, the time histories of forces and moment in pitch and combined mode is shown in Figures 18 and 19.

These plots reveal that box-fish, due to its asymmetry about y-z plane doesn't produce symmetrical surge forces while its symmetry in x-z as well as x-y planes resulted in symmetrical heave forces and pitch moments. From heave simulations, the hydrodynamic coefficients that can be evaluated are X_w, Z_w and M_w. From the pitch simulations the derivatives X_q, Z_q and M_q can be evaluated. Combined mode simulations yield coupled derivatives which are not of interest to this paper. The other derivatives can also be evaluated considering the motions in the horizontal plane and also by considering roll into account.

6 CONCLUSIONS

Box-fish owing to its non-streamlined shape has poor controllability. They need extra thrust from the pectoral fins to supplement the thrust produced by the caudal fin. Their tail length is too short to generate reverse Von-Kármán vortex street of vortices for improved power. This tail form helps the fish in sustaining power for a longer time. Nevertheless, this work provides an initial frame work for the estimation of hydrodynamic derivatives for a UUV in the form of a box fish-the simplest possible mode of implementation for bio-inspired propulsion. 2D results have helped us in reasonable qualitative predictions. Quantitatively, the results are yet to be verified either with experimental or published ones. For more accurate prediction, overset grids and 3D models are suggested.

7 FUTURE WORK

Nature has its own way of compensating for the shortcomings imposed on its own creation. The carapace on the fish's body is believed to reduce drag and direct flow such that the fish attains better manoeuvrability (Van Wassenbergh, van Manen, Marcroft, Alfaro, & Stamhuis 2015). Moreover, the role of the pectoral fins in augmenting the thrust produced by caudal fin is unexplored in the present work. The present work will be extended with the inclusion of carapace and pectoral fins in the future works. The hydrodynamic forces and moments will be analyzed using a Fourier series method (Janardhanan & Krishnankutty 2009) for obtaining the hydrodynamic derivatives of the hull form.The trajectories of the UUV in standard manoeuvres such a turning circle and zig-zag will be predicted to finally arrive at its controllability, counter-controllability and stability characteristics.

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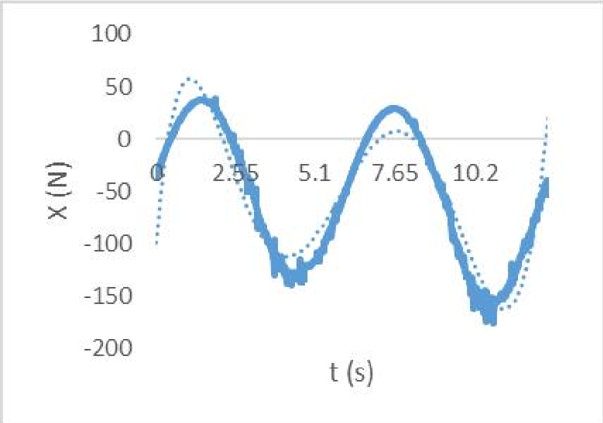
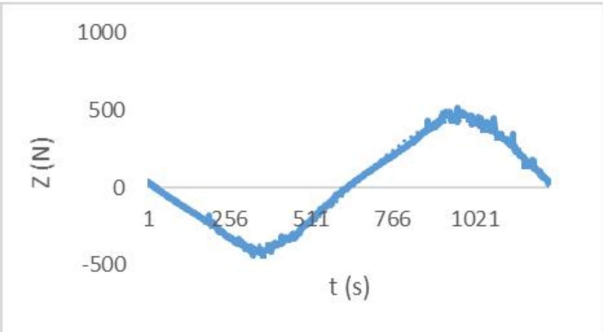
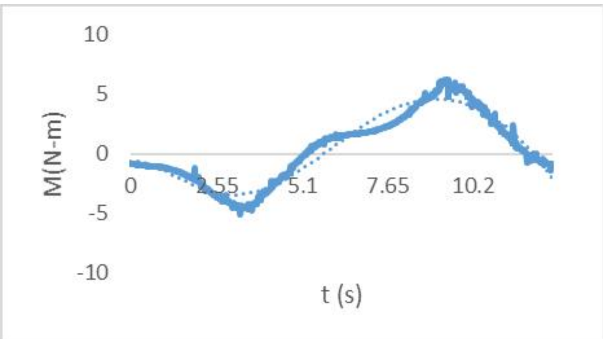


(a) Surge force

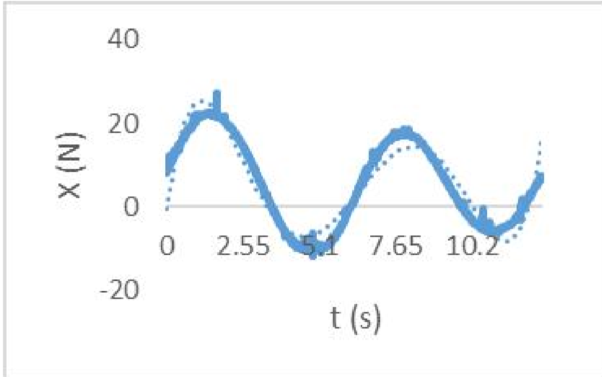


(b) Heave force

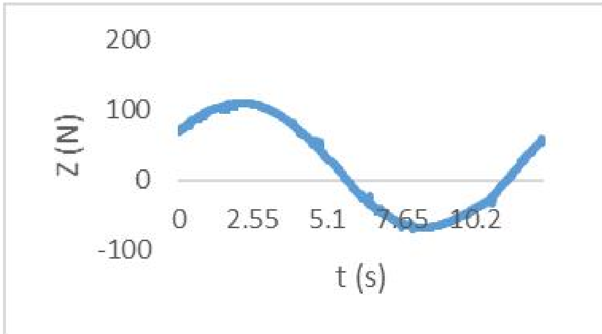


(c) Pitch moment

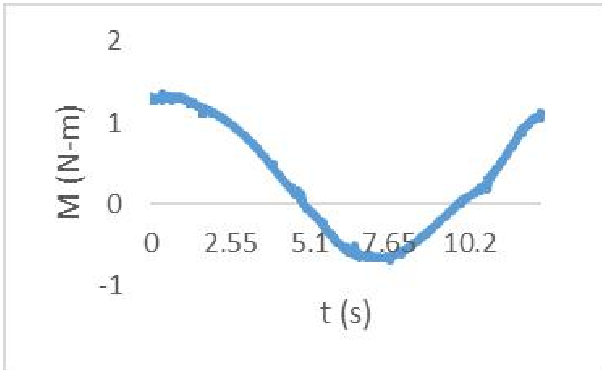
Figure 17: Time histories of forces and moment in heaving motion



(a) Surge force

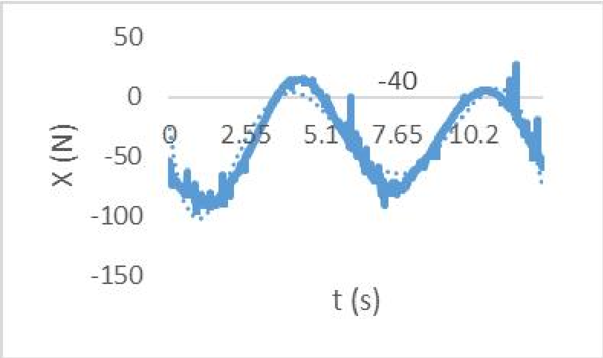


(b) Heave force

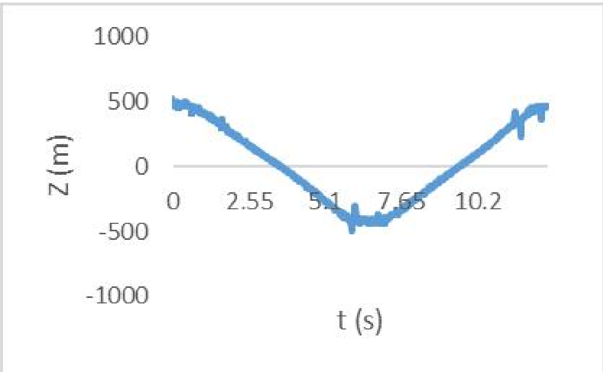


(c) Pitch moment

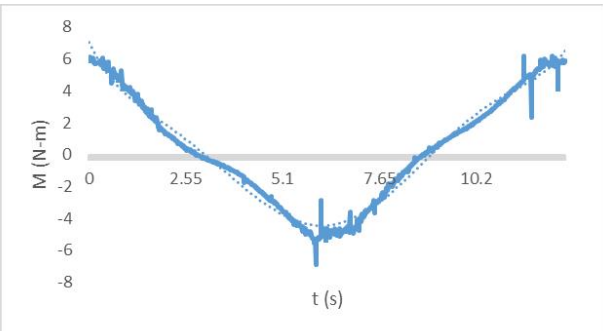
Figure 18: Time histories of forces and moment in pitching motion



(a) Surge force



(b) Heave force



(c) Pitch moment

Figure 19: Time histories of forces and moment in surge motion

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Evasion Attacks On Svm Classifier

Publisher: IEEE Cite This PDF

Maria ; Mikhiya James ; M Mruthula ; Vismaya Bhaskaran ; S Asha **All Authors**

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Abstract: Support Vector Machine (SVM) is one of the main classification techniques used in many security-related applications like malware detection, spam filtering, etc. To incor... **View more**

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Abstract:
Support Vector Machine (SVM) is one of the main classification techniques used in many security-related applications like malware detection, spam filtering, etc. To incorporate SVM into real-world security applications they must be able to cope up with the attack patterns that will lead to misclassifications. In this system, the vulnerability of SVM to evasion attacks are measured. A simple but effective approach is presented that can be exploited to systematically assess the security of widely-used classification algorithms against evasion attacks. To identify the vulnerabilities some transformations are applied to the testing set of handwritten digit images. The obtained result is plotted as a confusion matrix that allows the visualization of the performance of the algorithm against evasion attack. The work demonstrates the correctness and performance of existing adversarial systems. This work also compares the performance level of feature descriptors like Speeded Up Robust Features (SURF) and Histogram of Oriented Gradients (HOG) and their level of vulnerability to the evasion attacks are also measured. It can be inferred from our system that, even though both HOG and SURF are vulnerable to evasion attacks, those images that are extracted using SURF is less vulnerable compared to those images extracted using HOG features.

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I. Introduction

Nowadays machine learning algorithms are used in a wide range of applications. It is widely used in security sensitive applications such as malware detection and spam detection because of its ability to detect attacks or variants of known ones. Evasion attacks [6] are the most popular type of attack that can occur during system operation in adversarial settings. Evasion attacks manipulate the input data at test time and cause misclassifications. Even though many pattern recognition techniques are used in security sensitive applications to distinguish between malicious and legitimate samples, still there exist some attackers who intend to misclassify malicious data as legitimate data at test time. Current research shows the fact that SVM are vulnerable to evasion attacks as they never consider the existence of an attack. Adversarial machine learning algorithms [7] are built to exploit the vulnerabilities in a machine learning algorithm. These vulnerabilities are simulated by training the learning algorithm under various attack scenarios and policies. To better understand the vulnerability of SVM classifier in adversarial settings some manipulations are made in the input data at test time.

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POS Tagger for Malayalam using Hidden Markov Model

Sindhya K Nambiar ; Antony Leons ; Soniya Jose ; Arunsree All Authors

Abstract: The NLP applications uses the parts of speech tagging as the preprocessing step. For making POS tagging accurate, various techniques have been explored. But in Indian lan... **View more**

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Abstract:

The NLP applications uses the parts of speech tagging as the preprocessing step. For making POS tagging accurate, various techniques have been explored. But in Indian languages, not much work has been done. This paper describes Part of Speech Tagger by incorporating Hidden Markov Model is built. Supervised learning approach is implemented in which, already tagged sentences in Malayalam is used to build Hidden Markov Model.

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I. Introduction

Linguistic processing uses Part of Speech (POS) as a feature to translate the sentences. A POS Tagger is a translator that takes the sentences and outputs the word sequences with its part of speech tags. Tagger examines each word with its context in the sentence during the analysis process.

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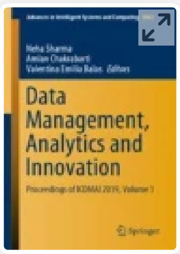

Data Management, Analytics and Innovation pp 697–711

Simulation-Based Performance Analysis of Location-Based Opportunistic Routing Protocols in Underwater Sensor Networks Having Communication Voids

Sonali John, Varun G. Menon & Anand Nayyar

Conference paper | First Online: 25 October 2019

Part of the Advances in Intelligent Systems and Computing book series (AISC,volume 1042)

Abstract

Recently, Underwater Wireless Sensor Networks (UWSNs) have emerged as a prominent research area in the networking domain due to their wide range of applications in submarine tracking, disaster detection, oceanographic data collection, pollution detection, and underwater surveillance. With its unique characteristics like continuous movement of sensor nodes, limitations in bandwidth and high utilization of energy, efficient routing and data transfer in UWSNs have remained a challenging task for researchers. Almost all the protocols proposed for terrestrial sensor networks are inefficient and do not perform well in an underwater environment. Recently Location-Based Opportunistic Routing Protocols have been observed to perform well in UWSN environments. But it is also observed that these protocols suffer from performance degradation in UWSN networks with communication voids. The objective of this research paper is to discuss the working of major Location-Based Opportunistic Routing Protocols in UWSNs with communication voids and to highlight their issues and drawbacks. We analyzed the Quality of Service parameters, packet delivery ratio, end-to-nd delay, throughput, and energy efficiency of two major Location-Based Opportunistic Routing Protocols, i.e., Vector-Based Forwarding (VBF) and Hop-by-Hop VBF (HH-VBF) in UWSNs with communication voids using NS-2 simulator with Aqua-Sim extension. Simulation results state that both VBF and HH-VBF protocols suffered from performance degradations in UWSNs with communication voids. In addition to this, the paper also highlights open issues for UWSN to assist researchers in designing efficient routing protocols for UWSNs having multiple communication voids.

Keywords

Aqua-Sim **Communication void**

Hop-by-Hop Vector-Based Forwarding (HH-VBF)

NS-2 **Opportunistic routing**

Performance analysis **Quality of Service (QoS)**

Underwater Wireless Sensor Networks (UWSNs)

Vector-Based Forwarding (VBF)

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RubiCrypt: Image Scrambling Encryption System Based on Rubik's Cube Configuration

Publisher: IEEE

Joffin Joy ; Litty Koshy All Authors

Abstract: This paper proposes an image-encryption algorithm based on the Rubik's cube configuration,allowing for multi-dimensional security keys. The input image is scrambled using... **View more**

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Abstract:

This paper proposes an image-encryption algorithm based on the Rubik's cube configuration,allowing for multi-dimensional security keys. The input image is scrambled using the random configuration of a Rubik's cube. Here the aim is to encrypt or decrypt an image using a custom pixel scrambling algorithm. It uses a Rubik's Cube as the encryption & decryption key, which allows for 43,252,003,274,489,856,000 (43 quintillion) distinct key configurations. RubiCrypt makes use of several image processing algorithms from OpenCV for scanning the cube in real-time. Finally, Analysis along with experimental results shows that the proposed encryption scheme can achieve good encryption as well asconsiderable hide-ability. Which can resist all the elements related with statistical and differential attacks.

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Contents

1. Introduction

Privacy is one of the key factors governing a technological deployment. The end user privacy is always kept in mind by developers all over the world. Especially in areas such as cloud computing which holds large contents of digital user data, mere raw input to these systems makes the user data unsafe.

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IBICA 2018: **Innovations in Bio-Inspired Computing and Applications** pp 406–412

A Comparative Study of Performance and Security Issues of Public Key Cryptography and Symmetric Key Cryptography in Reversible Data Hiding

S. Anagha, Neenu Sebastian & K. Rosebell Paul

Conference paper | First Online: 21 May 2019

Part of the Advances in Intelligent Systems and Computing book series (AISC,volume 939)

Abstract

Security of data is the main aspect to be considered in the digital network. Data transmission can be made secure by performing reversible data hiding in images. Here the data can be hidden and transmitted inside a host image. Security to the image can be provided by various algorithms like symmetric key algorithm and public key algorithms.

This paper provides a comparative study of AES and RSA algorithms for image encryption and reversible data hiding. Data embedding in both cases is done by histogram shifting method. The RSA algorithm can be used for encrypting the image to provide higher security but consumes more time whereas the security of image in AES algorithm is comparatively small but consumes only small amount of time for both encryption and decryption.

Keywords

Encryption **Data hiding** **Data embedding**

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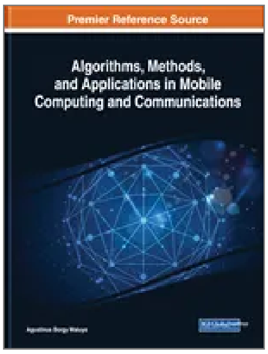

Moving From Topology-Dependent to Opportunistic Routing Protocols in Dynamic Wireless Ad Hoc Networks: Challenges and Future Directions

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Abstract

Mobile ad hoc networks (MANETs) are a collection of wireless devices like mobile phones and laptops that can spontaneously form self-sustained temporary networks without the assistance of any pre-existing infrastructure or centralized control. These unique features have enabled MANETs to be used for communication in challenging environments like earthquake-affected areas, underground mines, etc. Mobility and speed of devices in MANETs have become highly unpredictable and is increasing day by day. Major challenge in these highly dynamic networks is to efficiently deliver data packets from source to destination. Over these years a number of protocols have been proposed for this purpose. This chapter examines the working of popular protocols proposed for efficient data delivery in MANETs: starting from the traditional topology-based protocols to the latest opportunistic protocols. The performances of these protocols are analyzed using simulations in ns-2. Finally, challenges and future research directions in this area are presented.

Chapter Preview

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Introduction

Recent advances in wireless technology have led to the exponential growth and usage of wireless mobile devices worldwide. Today billions of wireless devices are connected with the help of infrastructure like access points and base stations. These infrastructure supported wireless networks provide an increasing number of wireless local area network (LAN) hot spots, allowing travelers and users with portable laptops and mobile phones to surf the Internet from hotels, airports, railway stations, coffee shops and other public locations. However, these infrastructure supported wireless network comes with a number of limitations. They consume plenty of time and money for installation and maintenance; have constraints in flexibility, suffer from low utilization of local wireless resources and are particularly vulnerable to natural disasters and unpredicted failures. To overcome these limitations, self-sustained, infrastructure-less and decentralized wireless networks have been proposed, known as mobile ad hoc networks (Giordano and Lu, 2001; Chlamtac et al., 2003; Menon & Prathap, 2016).

Mobile ad hoc networks (MANETs) are a collection of wireless devices like mobile phones, laptops, PC's and iPads that can form instantaneous temporary networks without the support of any pre-existing network infrastructure or centralized control. It works as an autonomous system of mobile hosts connected by wireless communication links. The network is configured in a way that all the devices can dynamically join or quit the network at any time without disrupting communication between other devices. Every device in the network plays the dual role of a router and a host, cooperates and coordinates with each other to make routing decisions in the network. Data is transmitted in the network in a store and forward manner from the source node to the destination node via the intermediate nodes. Ease of deployment, speed of deployment and the ability to self-organize and self-adapt without the help of any underlying infrastructure has contributed to the growing popularity of MANETs in research as well as in industry. Today MANETs are used for communication and resource sharing in numerous challenging environments like earthquake and volcano affected areas (Mase, 2011; Menon et al., 2016), underground mines, battlefields etc. Figure 1 shows an example MANET used in disaster recovery operations

Figure 1. MANETs in disaster recovery operations
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One of the major challenges in these highly dynamic networks is to efficiently deliver data packets from the source to the destination device. Ensuring reliable and continuous communication between the devices is yet another major challenge in these networks. Over these years a number of routing protocols have been proposed for data delivery and communication in MANETs. Figure 2 gives the taxonomy of all the protocols proposed for MANETs. Recent advancements in wireless technology have enabled mobile devices in MANETs to move freely with higher speeds in random directions. The mobility and speed of these wireless devices have become highly unpredictable and is increasing day by day. Also the number of connected devices in the network is increasing rapidly leading to highly dense and scalable ad hoc networks. As the mobility and number of devices increases in the network the performance of most of the existing routing protocols comes down drastically leading to low transmission efficiency and reduced Quality of Service. Very few researches have been done to identify the reasons behind this performance degradation.

Figure 2. Taxonomy of protocols proposed for MANETs
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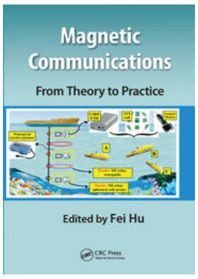

Opportunistic Routing Protocols in Underwater Acoustic Sensor Networks: Issues, Challenges, and Future Directions

By Varun G. Menon (/search?contributorName=Varun G. Menon&contributorRole=author&redirectFromPDP=true&context=ubx)

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