PhD Thesis

entitled

THESIS TITLE

Submitted in partial fulfillment

for

the award of the degree of

Doctor of Philosophy

by

Mr. Your Name

(DYYCOXXX)

Supervisor

Dr. Supervisor's Name

October, 2013

Department of Computer Engineering

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Declaration

I hereby declare that the work being presented in this thesis entitled "Thesis Title" by me i.e. Mr. Your Name, bearing Roll No: DYYCOXXX and submitted to the Computer Engineering Department at Sardar Vallabhbhai National Institute of Technology, Surat; is an authentic record of my own work carried out during the period 2009 – 2014 under the supervision of Dr. Supervisor's Name.

Neither the source code there in, nor the content of the seminar report have been copied or downloaded from any other source. I understand that my result grades would be revoked if later it is found to be so.

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This is to certify that the submitted PhD Thesis entitled "THESIS TITLE" is an official record of actual research work carried out by Mr. YOUR NAME bearing Roll No: DYYCOXXX under my supervision and guidance. To the best of our knowledge, the matter embodied in the report has not been submitted for the award of similar degree elsewhere.

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This is to state that the thesis entitled Thesis Title submitted by Mr. Your Name (Admission No: DYYCOXXX) is approved.

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Acknowledgements

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Abstract

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List of Acronyms

WSN Wireless Sensor Network

MDS Multi-Dimensional scaling

CMDS Classical Multi-Dimensional Scaling

NMDS Non-metric Multi-Dimensional Scaling

WMDS Weighted Multi-Dimensional Scaling

WNMDS Weighted Non-metric Multi-Dimensional Scaling

RSSI Received Signal Strength

ToA Time of Arrival

AoA Angle of Arrival

TDoA Time Difference of Arrival

KF Kalman Filter

EKF Extended Kalman Filter

PF Particle Filter

UKF Unscented Kalman Filter

SVD Singular Value Decomposition

WSHAN Wireless Sensor Hole Aware Network

WSHUN Wireless Sensor Hole Unaware Network

CH Cluster Head

NA Nystrom Approximation

RMSE Root Mean Square Error

List of Symbols

K_t	Kalman Gain
x_t	State Vector
P_t	Updated Estimate Covariance
H_t	Observation Model
F_t	State Transition Model
B_t	Control Input Model
u_t	Control Input
w_t	Process Noise
Q_t	Covariance of the process noise
S_t	Innovation Covariance
R_t	Covariance of the observation noise
E	Expectation
Z_t	Observation model
$p(v_t)$	pdf of process noise
$p(n_t)$	pdf of observation
δ	Dirac Delta function
$\tilde{y}_t$	Innovation Residual
$\tilde{x}_{t\|t-1}$	Predicted State Estimate
$\tilde{y}_t$	Innovation Residual
$\tilde{w}_t$	Weights Normalized
$\hat{x}_{t-1\|t-1}$	A priory state estimate
$f(.)$	Nonlinear state transition function
$h(.)$	Nonlinear output transition function
$\mathcal{N}$	Gaussian Normal density function
N	Number of nodes in the network
n	Number of anchors in the network

Chapter 1

Introduction

Your first chapter. Go on and place some figures as given below.

(a) something here

(b) without border

Figure 1.1: The caption is here. I can refer to the subfigures (a) and (b). In case the subcaption-number i.e. (a) is not to be displayed above, then do not use [ ] in the subfigure command.

I can also refer to the sub-equations using 1.1(a) and 1.1(b) in figure 1.1. Nothing to say about the references. You could refer this way [1–3] or this way Akyildiz et al. [4]. The citet command is possible due to the “natbib” package and “IEEETranN.bst” file.

1.1 First Section

Lets move ahead with tables.

Table 1.1: My first table

Technique	H/W	Distance	Limitations
RSSI	No	Few Meters	Noise, Interference in range
ToA	Yes	Few Cms	Nodes synchronization
TDoA	Ultrasound Txr	Few Meters	Maximum distance of work
AoA	Set of receivers	few degrees	Work on small sensor nodes

I can always refer this table 1.1 using its label. We can include the equations as well. Both environments viz. begin{equation} – end{equation} and begin{eqnarray} – end{eqnarray} are available. I personally prefer the later one. An example is given below in equation 1.1.

$$x(t) = \begin{cases} 0, & \text{if } t < 0, \\ 1, & \text{otherwise.} \end{cases} \tag{1.1}$$

That's all from me. You may explore as much as you want.

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List of Publications

[1] S. Patil, A. Gupta, and M. Zaveri, “Recovery of lost target in Wireless Sensor Network,” *submitted in EURASIP Journal on Wireless Communications and Networking*, (Manuscript revision requested).

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