Individual Contribution Document

October 2025

Individual Contribution Statement

This document records the contributions of each team member to the project **"Modeling Sensor Drift and Compensation in IoT Networks"** for the course **Engineering Systems Design & Modelling**. The work has been divided among three members as detailed below; We hereby declare that the information is accurate to the best of our knowledge.

Name: Jonathan Akuaku Edem **Index No:PG4129024**
Name: Ardayfio Samuel **Index No:PG41248224**
Name: Kojo Pobi Aning **Index No:PG4129024**

Over the course of this project, the following tasks were undertaken, with each team member responsible for significant portions as described:

Edem and Samuel focused primarily on the foundational conceptual work. This included selecting the sensor drift mechanism to model, formulating the stochastic drift model, stating and justifying the main assumptions (such as modelling drift as a random walk), choosing initial simulation parameters (e.g. drift variance, measurement noise), and setting up the simulation of the drift + measurement data. They also contributed to the early visualization of results and initial debugging of simulation code.

Edem and Samuel also took responsibility for algorithmic implementation, especially the design and implementation of the Kalman filter. This involved defining the state-space model, choosing and tuning the covariance matrices Q and R, configuring the Simulink block (including issues of observability, correct dimensioning of matrices such as G and proper measurement matrix C), and integrating the "before vs after" error metrics (RMSE, MAE, drift rate). They also worked together to develop the plots and graphs to aid error analysis, and collaborated on debugging problems arising from mismatches or configuration conflicts in the model.

Kojo Aning Pobi is primarily responsible for documentation and dissemination of the work. This includes writing the full report (introduction, methodology, results, discussion), preparing presentation slides, integrating all sections,

ensuring consistency in notation and formatting, and performing final editing and proofreading. He also arranged for alignment between simulation outputs, figures, and the narrative to ensure clarity and coherence for the audience.

In terms of approximate effort share, the division has been as follows:

- Edem and Samuel: $\approx 75\%$ of the work
- Person 3: $\approx 25\%$ of the work

We confirm that we have contributed to the parts listed under our responsibilities and accept responsibility for their correctness and completion. All team members agree to the final submission and presentation.