ANALYSIS OF ALTERNATIVES

A technical specification is a document that defines a set of requirements that a product or assembly must meet

Technical Specifications

- common for both spikes:

- Database should reset instantly when the particular threshold is crossed for the length of any motion.
- When the motion length is in the range >T1 and <T2 where T1 and T2 are predefined thresholds, the system should send an email to the user.
- Summary of the last 5 motions is sent to the user by email when the database has at least 5 motions.

- specific to SPIKE 1 (LOCAL SERVER):

- The firebase listeners run on the local server should be called associated event occurs.

- specific to SPIKE 2 (FIREBASE SERVER):

- Firebase should call the functions associated with each event whenever a particular event occurs.

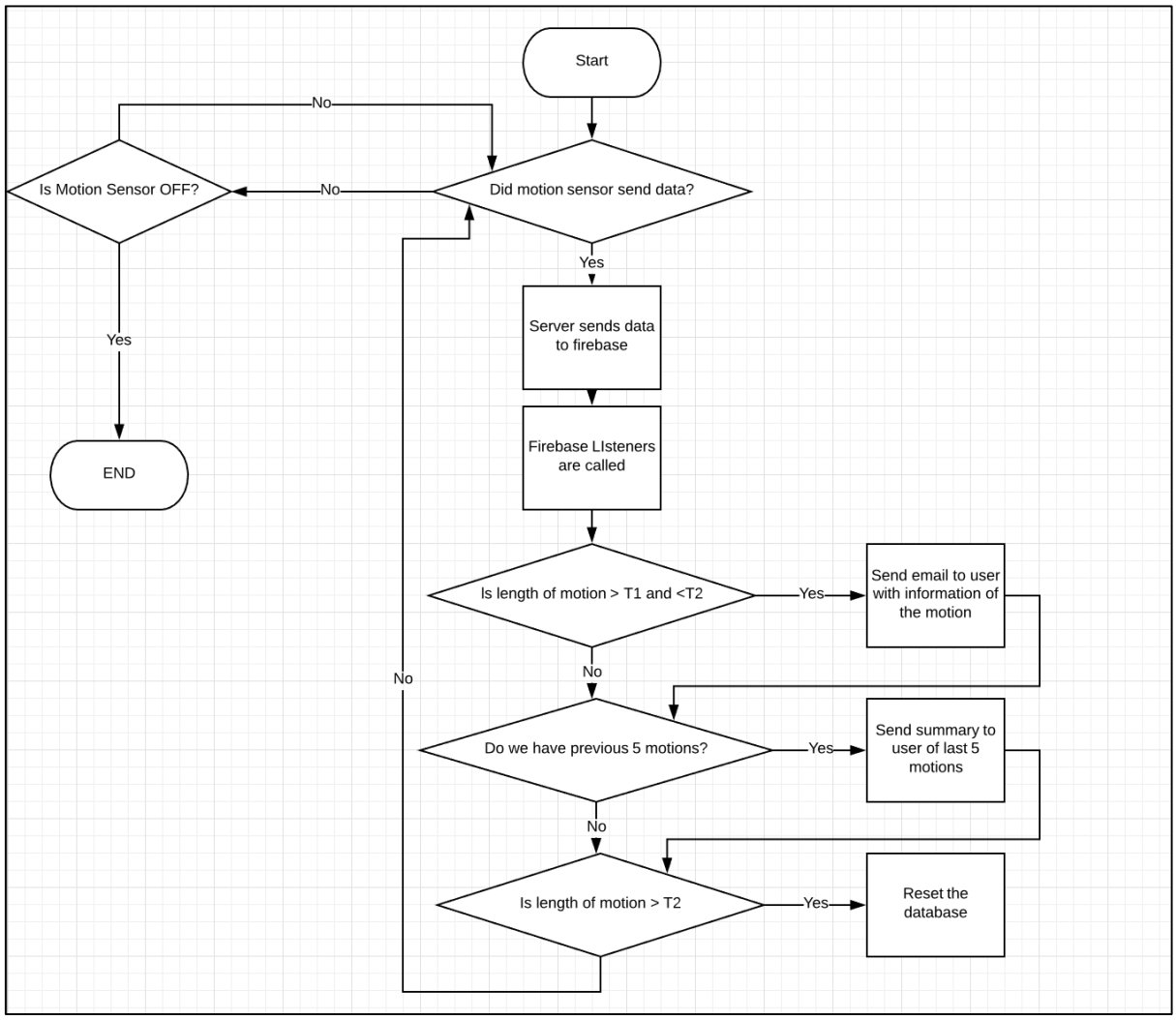
Non-technical Specifications:

From the user's perspective

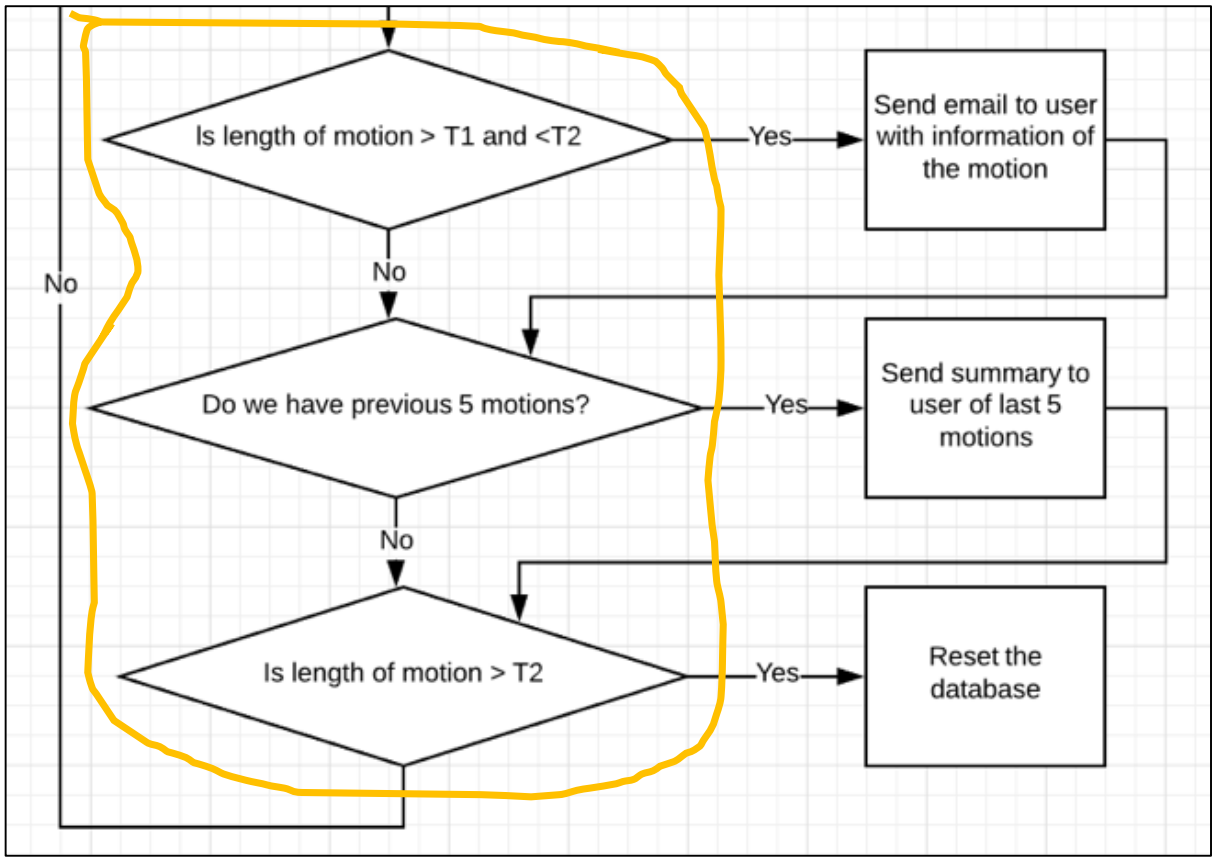
- Time taken for the email to be sent to the user should be as fast as possible.
- Time taken for the firebase to add data to the database should be as fast as possible.
- Time taken for motion sensor to send data to server should be as fast as possible.
- Server should be available 24/7.
- Email sent to the user should be easy to understand.

General Overview of how the system works

This is not specifically referring to SPIKE-1 or SPIKE-2 implementation.



From the above flowchart, I have taken a portion of the flowchart to show the difference in SPIKE-1 and SPIKE-2 implementation. The portion of the flowchart is shown below:



Inside the orange portion represents the part where implementation wise, SPIKE-1 and SPIKE-2 differs.

For SPIKE-1, the functions for sending email and resetting the database are stored are stored locally.

For SPIKE-2, the functions are stored in the firebase server.

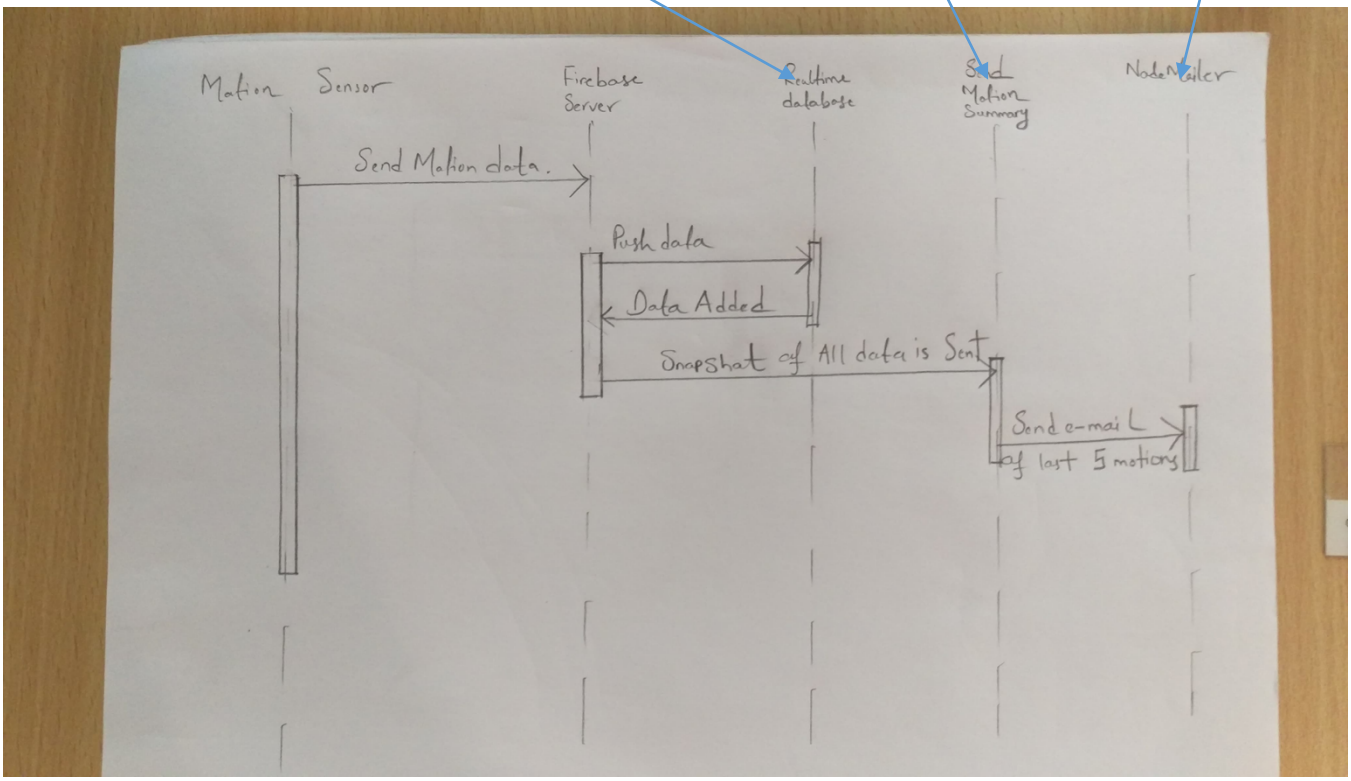
SEQUENCE DIAGRAM displaying the interaction that happens for sending an email to the user about the summary of the last 5 motions

(SPIKE 2 – FIREBASE FUNCTIONS)

Database where the motion information is stored

Function which is stored in the firebase which is responsible for checking if previous 5 motions are available in the database and then calls the mail function to send the email if

Library responsible for actually sending an email



Spike Comparisons:

In Spike 1, the functions are stored in the local server whereas
in Spike 2, the functions are stored in firebase server

- Scalability

  For Spike 1, we need to scale our local servers on our own if traffic increases on the server.

  For Spike 2, the servers will automatically scale up or down depending on the server traffic.

  So, in terms of scalability, Spike 2 is better as we do not have to worry things like server configuration, provisioning new servers or decommissioning old ones. We just need to worry about the code.

- Ease of database access

  For Spike 1, we can only access the database and add records from motion sensor if our local server is always running.

  For Spike 2, as the functions are on the cloud, the cloud automatically runs our functions without the need for us to do anything and the database can be accessed from anywhere.

- Hosting

  For Spike 1, to host our code live we need to find a hosting provider and pay for hosting our code.

  For Spike 2, hosting our code live is as easy as just deploying our code from the terminal using one line of code “firebase deploy”.

- Separation of concern

  For Spike 1, we need to manually organize our code separately.

  For Spike 2, the back-end code is clearly separate as everything is put into functions and deployed to firebase.

- Teamwork

  For Spike 1, as the team members are familiar with node.js, it will be easy to conduct this spike as a team and collaboration will be faster.

  For Spike 2, team members need to explore the use of firebase functions with node.js. They need to learn on how to use it and also how to deploy them. So, this may take time for the team and collaboration process will be slower.

WHICH SPIKE MEETS WHICH CRITERIA

	SPIKE-1	SPIKE-2
Scalability		
Ease Of database access		
Hosting		
Separation of Concern		
Teamwork		

Red corresponds to a spike that has not met some criteria whereas
Green corresponds to a spike has met some criteria.

Our recommendation:

We recommend going with server less technology (Spike 2).
As seen above, Spike 2 meets most of our criteria except one which is team work. But we don't think that will be a long-term problem as the team members can learn the new technology over time.
Learning the new technology and implementing it will provide benefits, like an application which will be scalable, maintenance-free, easy-to-access database and will also provide us with a separation of concern.