CHAPTER 3

RESEARCH METHODOLOGY

3.1 Data Collection

The data used in this study are the static results of the game between COM vs COM PES 2021. The data set consists of the results of the PES 2021 game play that has ended, and the data is collected and then modeling designed using the NDFA (Non-deterministic Finite Automata) method.

3.2 Research Design

In the study, a modeling design of the artificial intelligence NDFA (Non-deterministic Finite Automata) will be carried out in the PES 2021 game as proof that applying FSM artificial intelligence to the PES 2021 game.

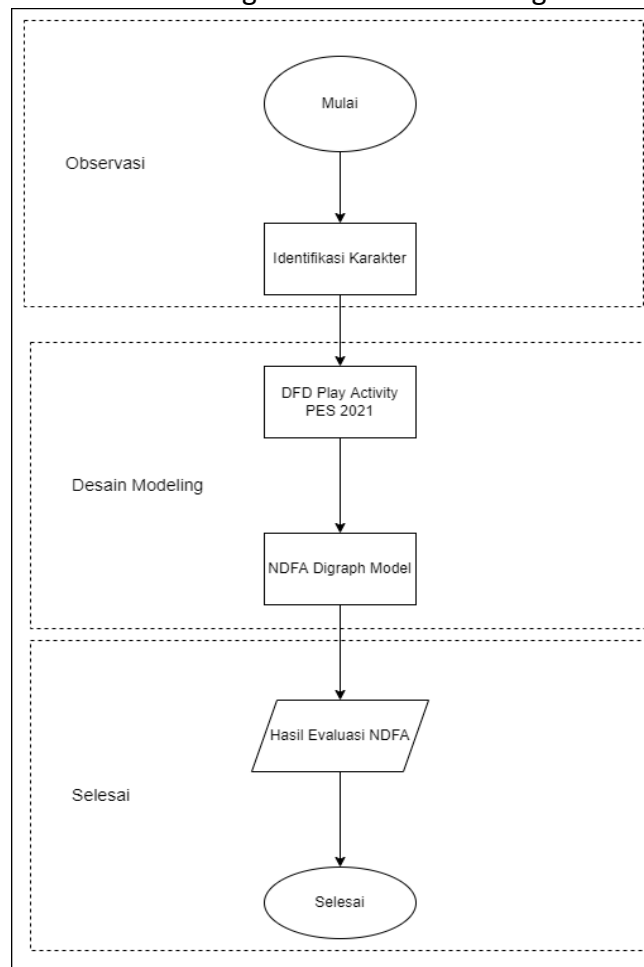The Research Stages are addressed in figure 3.1

Figure 3.1 Research Design

In the first stage, planning is carried out by starting the game between com vs com. The final stage after the game is finished, observations are made from the results of the match that has been running, carried out repeatedly as many as ten times to obtain the results of the comparison between com vs com. The third stage of the match results was carried out modeling design using the NDFA (Non-deterministic Finite Automata) method. The last stage is the result of the NDFA (Non-deterministic Finite Automata) method which proves that PES 2021 players use FSM intelligence in the game.

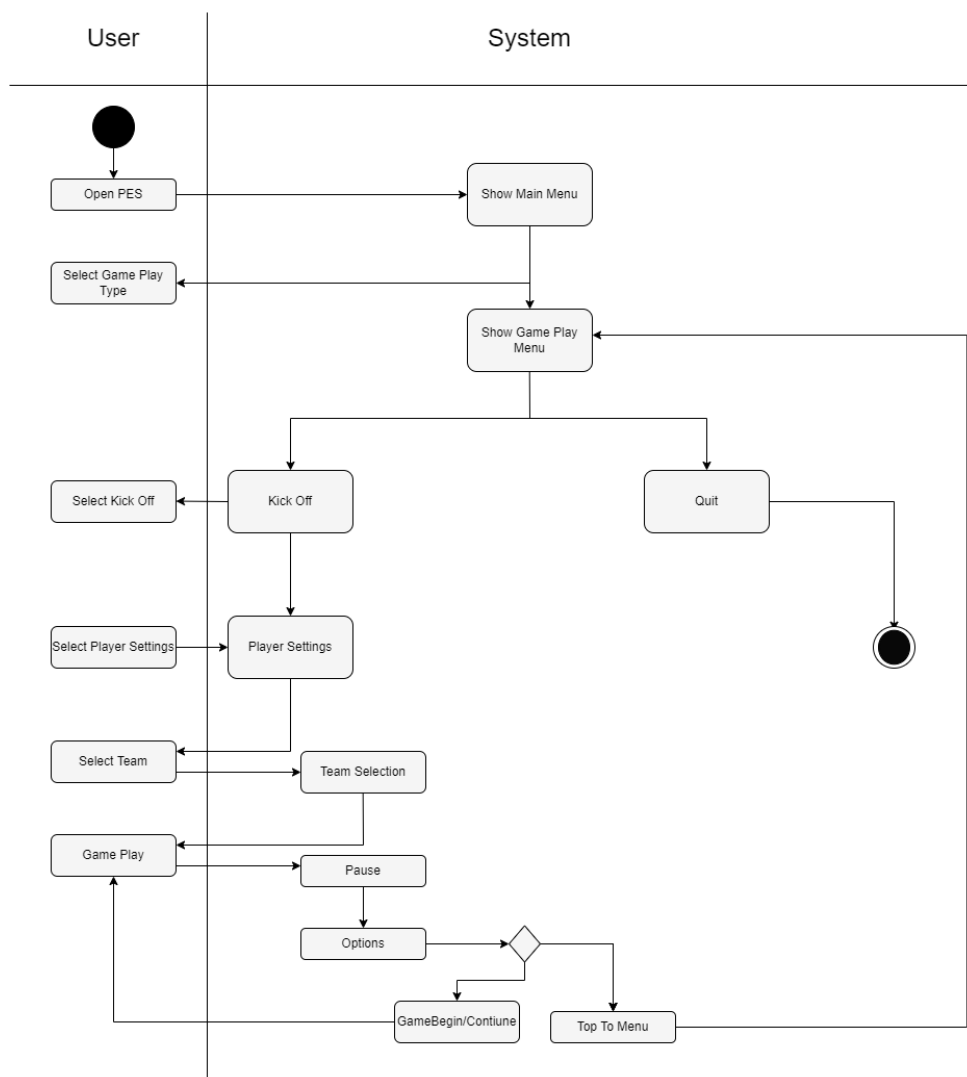## 3.3 *Activity* Diagram in PES 2021

Figure 3. 2 Activity Diagram

In figure 3. 2 illustrates a diagram of the play activity that shows how to

start the game and end the game. Here's an explanation of the activity diagram"

1. To start the game, open PES 2021, it will display the Main Menu.

2. Selecting the game play type, it will display the category of game play, such as KickOff, eFootball, Statisctick, Setting, Quit. If the player chooses to stop playing, he will get an option by selecting "no" will return to the main menu and selecting "he" will close the game.

3. Selecting the player setting

4. Choose the team or country to use for the gameplay.

5. Choosing a team setting, it allows setting up formations and substitutions.

6. Starting the game, during play the user can pause the game to enter the menu of other options such as changing the team's game formation and substitutions. Users can also decide to continue or end the game.