Design Multi Input Automatic Identifier System Class B for Indonesian Fishery

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Abstract

The need for technology that can help Indonesian fishermen is needed to improve fishing yields. Based on BPS data Indonesian fishermen dropped from 1,7 million to 64 thousand in 2013. This is due to several factors, including unfavourable professions for fishermen. This is insufficient fishing equipment for fishing. One of them is the need for navigation tools that are easily understood by traditional fishermen and in accordance with the needs in fishing. We propose the design of Class B's Automatic Identifier System (AIS) to help fishermen navigate and find fish points. In this system we also propose determining the point of fish based on information from fishermen who are collectively collected by the fishermen. With this design it is hoped that the fish point can be shared with other fishermen. The result this design, it is expected to be able to assist fishermen in navigating using AIS so that fishermen security with AIS system with multiple sensor can be improved find the point of fish obtained from sending data from several fishermen and collect data weather for safety.

Keywords: AIS, Fishery, Fish Point, navigation, safety Fishermen, Sensor

1. Introduction

The need for technology that can help Indonesian fishermen is needed to improve fishing yields. Based on BPS data Indonesian fishermen dropped from 1.7 million to 64 thousand in 2013. This is due to several factors, including unfavorable professions for fishermen. This is insufficient fishing equipment for fishing. One of them is the need for navigation tools that are easily understood by traditional fishermen and in accordance with the needs in fishing.

Shipping security is the main thing in a cruise with a level of awareness by using identification from the boat, tracker and monitoring (Chang, 2004). Based on safety of life at

sea (SOLAS) at vessek meliputi ship reporting system, vessel traffic system, global maritime distress and safety system, electronic chart display and information system, and automatic identification system (Chang, 2004). The vessel information needed includes position, flag, type, etc. (Yang and Jeong, 2016) AIS integrated with sentinel-1 (Yang and Jeong, 2016). Some applications use wireless communication using frequency 2.4 GHz (Zainuddin et al., 2018). Development fishermen communication use lora with the maximum distance 3.73 Km (Fuada et al., 2019; Adiono et al., 2019) in previous studies had been carried out using a LORA-based small vessel multi gateway (Sumarudin et al., 2019) the use of ice is also used to avoid collision vessels on the beach (Tetreault, 2005). Boat detection uses combining AIS data and ALOS images to make boat detection based on satellite imagery (Watagawa et al., 2012).

In this paper, we propose the design of Class B's Automatic Identifier System (AIS) to help fishermen navigate and find fish points. In this system we also propose determining the point of fish based on information from fishermen who are collectively collected by the fishermen. With this design it is hoped that the fish point can be shared with other fishermen.

2. Design System Propose

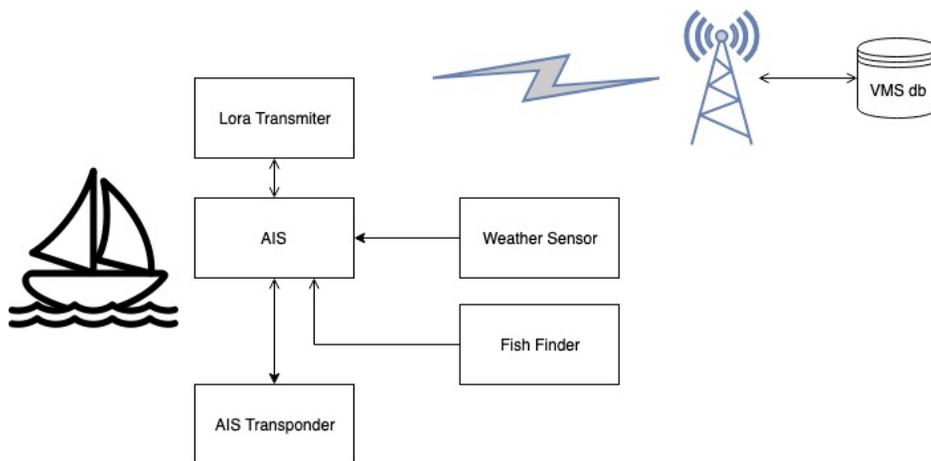Based on design, we propose design automatic identifier system utilize multi input.

Figure 1: Design System AIS for Fishery

This design consists of the AIS system using raspberry pi. In the system installed with open plotter to navigate the system using AIS transponder with class B using ray marine. For the needs of weather data and fish points using data sent using a LORA transmitter sent to the gateway.
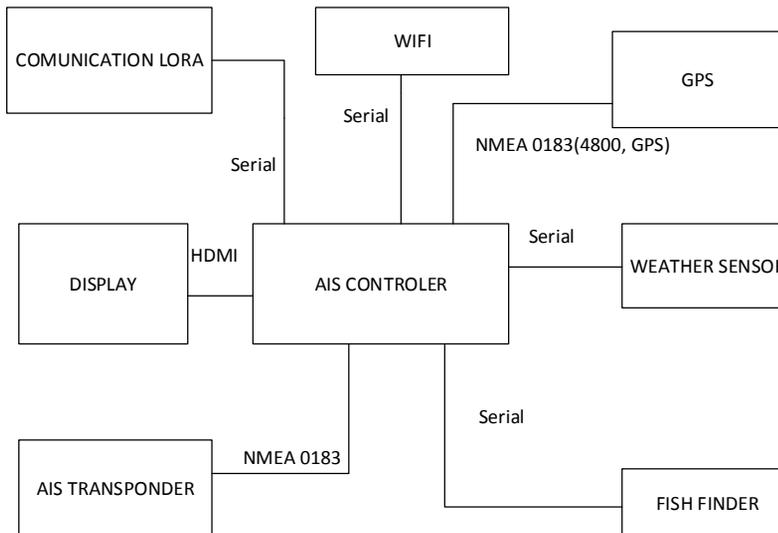
Figure 2 : Block System AIS

Based on the picture above, the system consists of an AIS controller which is an integrated system for multi-input developed. In this system we can add several inputs using an open plotter-based AIS controler. Open plotter is an open source that combines several features for the navigation needs of a ship. In the system that we built using AIS class B for AIS navigation and open plotter as a controller to combine the data that is run on the system. The system in Figure 2 shows the system for fishermen per year, the system helps navigation of fishermen when they are sailing. From this system it will be sent to the VMS using an AIS transponder that is received on the AIS side receiver mounted on the beach side. For fish point shipping needs will be stored in the AIS Controler and when receiving LORA signals / other communication systems will be sent and received data updates. For the needs of fishermen who will sail long distances, they will use satellite-based data communication. In Table 1, shown the features of the open plot used in this system.

Table 1. Feature AIS

No	Feature	Function
1	OpenCPN	Software navigation for vessel
2	SDR-AIS	AIS trasponder based on SDR
3	NMEA 0183	Receiver NMEA Data with serial communication
4	Wifi Acces Point	Cnncetion NMEA And signal K with other device
5	Digital and analog sensor	Read sensor digital and analog
6	I2C Wire	Read Sensor With I2C Communication
7	Dashboard	Visible data and instrument panel

Whereas the fish finder uses 200 KHz with maximum, 839 feat seawater readings. For realtime weather readings on a boat using the weather sensor initial sensor input to calculate the wind rotation. And use I2C wire for temperature, humidity and pressure. For wind direction using analog sensors, to determine rainfaal using digital sensors (Kuncoro et al., 2020).

3. Design Implementation

Based on the system design above, we use SDR-based AIS transponders and Raspberry Pi as a controler (Seen Figure 3).
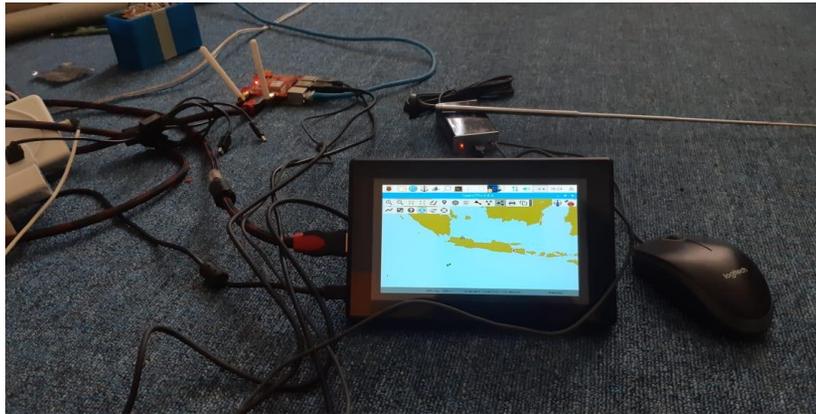

Figure 3: System Implementation

From the implementation, the system reads the ice signals from the boats around. The data is available in the system and provides information for Indonesian traditional fishermen to use (See Figure 4).
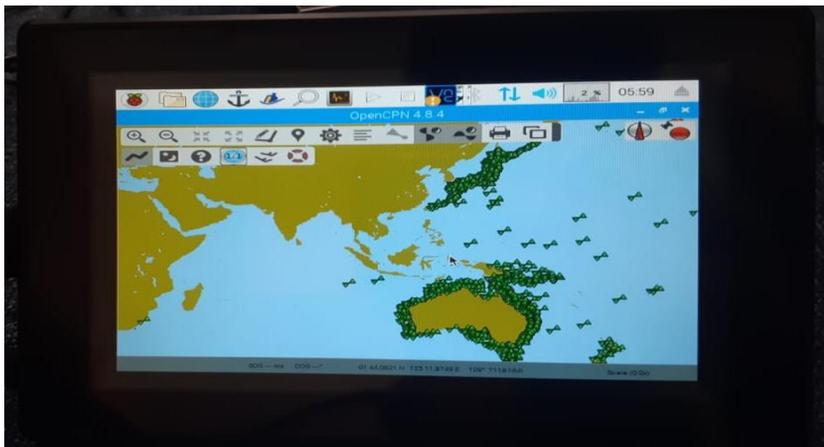

Figure 4: Display of AIS system

To provide a fish point on the VMS system, we use a fishfinder and the results of our detection are sent to the vms system. In Figure 5, it appears that the fish detection process uses a fish finder.

Figure 5: Fish finder

For the needs of fishermen who go further to sea can use communication satellites. For monitoring systems, a vessel management system (VMS) was built for data analysis needs. The results of this data analysis will be informed to fishermen using mobile apps (See Figure 6).

Figure 6: AIS System

From this design, it is expected to be able to assist fishermen in navigating using AIS so that fishermen security can be improved and find the point of fish obtained from sending data from several fishermen. For very long range communication fishermen can use communication satellites or TDM/TDMA based on IP with latency 650 ms - 1000 ms and bandwidth 2.4 Kbps – 2 Mbps.

Vessel monitoring systems, a vessel management system (VMS) was built for data analysis needs. This system uses a web base application that can be accessed by fishermen and government agencies to provide information about the existence of fish and the distribution of fishermen who are doing fishing.
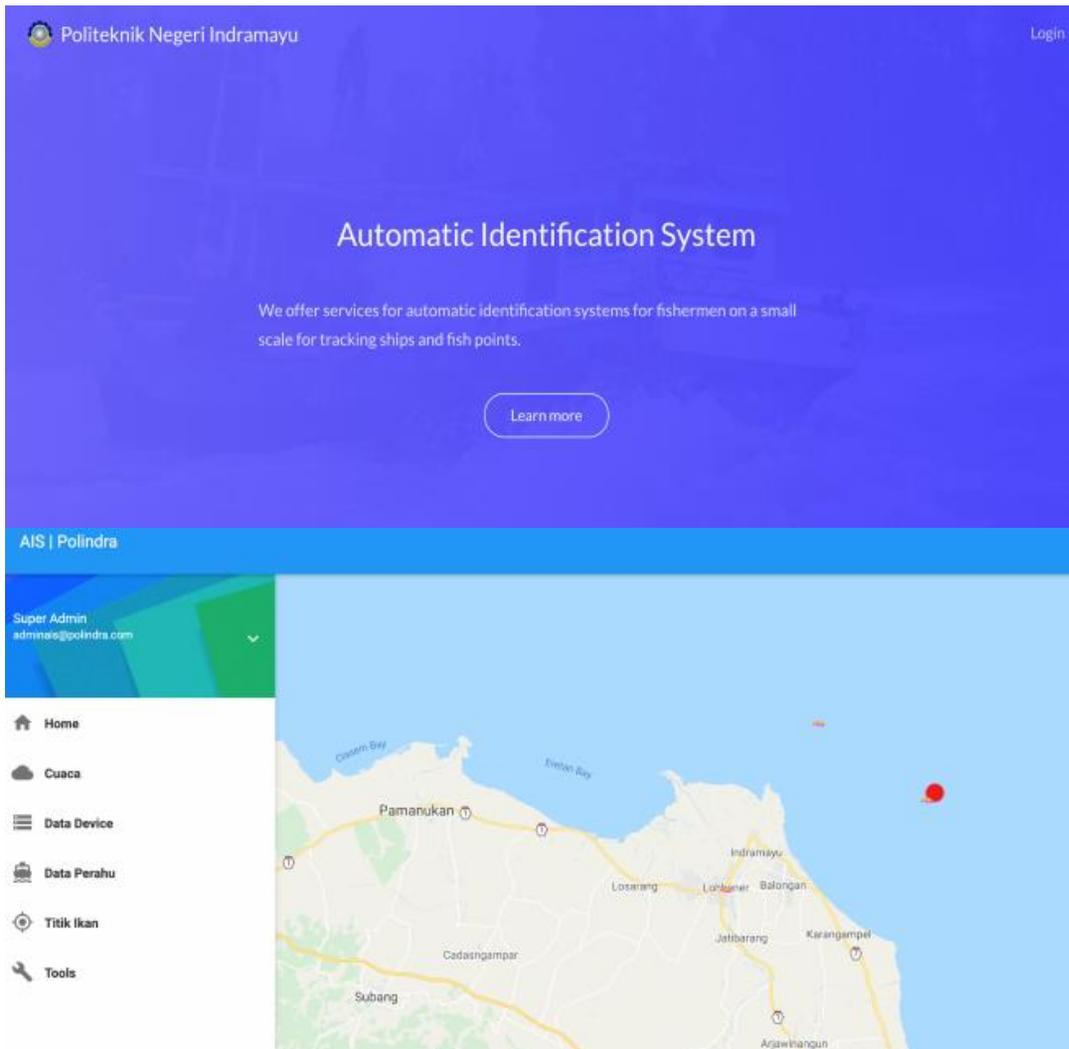

Figure 7: VMS AIS for Fishery

4. Conclusion

The result this design, it is expected to be able to assist fishermen in navigating using AIS so that fishermen security with AIS system with multiple sensor can be improved find the point of fish obtained from sending data from several fishermen and collect data weather for safety.

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