

## Conference Paper

# Animal Identification and Records Monitoring Tool using RFID (AIRMTR)

Jose Marie Buendia Dipay, Aleta C. Fabregas, and Remedios G. Ado

## Abstract

This study was conducted to design, develop and initially implement the Animal Identification and Records Monitoring Tool using RFID. Specifically, it identified the problems encountered in conducting Manual Tagging for Animal Clinic; the appropriate features of the tool that can be developed to address the problems encountered, and the respondents' level of acceptance of the user toward the developed tool in terms of functionality, reliability, usability, and performance.

The research used the qualitative-quantitative research method that utilized a researcher-made questionnaire and interview questions. The respondents of the study were one (1) Animal Care Specialist representative, one (1) Pretty Paws representative, five (5) veterinarian representatives and eighty (80) pet owners from different places. The problems encountered in conducting tagging for animal clinic were traditional animal tag may cause death to some animals; animal diseases and injuries by animal tagging; duplication and confusion in using animal tagging; and difficulty in maintaining records of vaccination, medication health check-ups using animal tagging.

The appropriate features of the tool that can be developed to address the problems encountered were: RFID can make the process of animal tagging faster and easier; and online scheduling and identification of pets in pet clinics are more convenient to use for both pet owners and veterinarians rather than the manual process.

The respondents' ratings for Animal Identification and Record Monitoring Tool using RFID were highly acceptable in terms of functionality (4.62); reliability (4.52); usability (4.68); and performance (4.59).

The government agencies may suggest that animals should be tagged using the developed system for monitoring purposes. Further research on Internet controlled devices may be conducted other than stand-alone offline software programs. This study may also be developed considering the following features: UHF as a tracking device for animals; individual registered users to make page where the client can edit, rate and price; displaying hex value using LCD; access to the shop's system to be validated; contraction number of the project with logo and clinic's validation.

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## OPEN ACCESS

**Keywords:** Animal Identification, Manual Tagging, RFID

## 1. Introduction

Animal identification methods have been used by individuals for more than a century. Early records show hot iron branding was used as a means of identifying valuable animals like horses of different country. As early times, identification was important to disease monitoring by means of ink tattoos. Even as far back early century certificates of safety and origin accompanied animal products during outbreaks of disease. Animal identification, no matter its medium, can be defined as “the combination and linking of the identification and registration of an animal individually, with a unique identifier, or collectively by its epidemiological unit or group, with a unique group identifier” (Bowling, 2008).

Over the centuries, animal identification has used several mediums. These mediums include ear tags, back tags, tattoos, and face brands. Recent methods of identification remain the same with some additional mediums; neck chains, tail tags, freeze brands, paint marks, and leg brands (APHIS, 2009a). This provided rough procedure and harmed and caused death to some animals. At that point the issue of animal cruelty arises and people and organizations worldwide made an effort to protect animals from cruelty and neglect. It was not too long after that, that the animal Identification system was implemented for use in domestic pets such as dogs and cats. This time, neglecting the old harsh methods and just simply putting id tags and the like. But most animal tags are visible and prone to damaged and alteration. This caused duplication, error, and confusion of animal’s identity.

So as to be able to identify animals with high integrity reliable data and neglecting cruelty, the proponent come up to the thesis entitled “Animal Identification and Records Monitoring Tool using RFID.” This uses RFID Technology Veterinarian services includes veterinarian practice, further subdivided into primary accession, consultant or specialist, advisory, contract, species specialist, government veterinarian services in a preventive veterinarian context, trouble-shooting services to back up services such as artificial insemination, drug and feed sales and domiciliary or house-call practice.

### 1.1. Objectives of the study

Animal identification has used several mediums. These mediums include ear tags, back tags, tattoos, and face brands. Recent methods of identification remain the same with some additional mediums; neck chains, tail tags, freeze brands, paint marks, and leg brands. This provided rough procedure can harm and cause death to some animals. It

was not too long after that, that the animal Identification system was implemented for use in domestic pets such as dogs and cats.

This time, neglecting the old harsh methods and just simply putting ID tags and the like. But most animal tags are visible and prone to damaged and alteration. This caused duplication, error, and confusion of animal's identity.

So as to be able to identify animals with high integrity reliable data and neglecting cruelty, the proponent came up to design, develop and implement Animal Identification and Records Monitoring Tool using RFID.

Specifically, this study sought to answer the following sub-questions.

1. What are the problems encountered in conducting manual tagging for animal clinic?
2. What are the appropriate features of the tool that can be developed to address the problems encountered?
3. What is the respondents' level of acceptance toward the developed tool in terms of:
  - 3.1. functionality;
  - 3.2. reliability;
  - 3.3. usability; and
  - 3.4. performance?

## 2. Materials and Methods

The researcher utilized the Input-Process-Output (IPO) Model of evaluation based on the General Systems Theory and was proposed in 1936 by the biologist, Ludwig von Bertalanffy, and further developed by Ross Ashby.

IPO is a functional graph that identifies the inputs, outputs, and required processing tasks required to transform inputs into outputs. The model is sometimes configured to include any storage that might happen in the process as well. The inputs represent the flow of data and materials into the process from the outside. The processing step includes all tasks required to effect a transformation of the inputs. The outputs are the data and materials flowing out of the transformation process. When used correctly, the IPO Model offers an efficient way to both analyze and document the critical aspects of a transformation process.

The Input included the formulation of the system, the hardware, the software, and the implementation of the system. The Process featured the procedures underwent by the researcher in order to answer the sub-problems. Lastly, the Output shown the outcomes of the study.

### 2.1. Design and procedure

The study used mixed method of qualitative and quantitative methods of research. Qualitative research is a nonnumerical, systematic subjective approach used to describe and to gain insight by exploring the depth, richness, and complexity inherent in a phenomenon (Juni & Afiah, 2014). The researcher conducted personal interview since the study focused on identifying problems encountered in conducting manual tagging for animal clinic; and the appropriate features to be developed to address the problems encountered. He prepared a list of topics and questions to be used in the discussion with the proponents.

Quantitative research method, on the other hand, according to Zikmund (2003), shows how the numerically measurable variables are arranged, conceptually, in relation to each other. The researcher adopted an ISO 9126 (International Organization for Standardization) questionnaire to determine the level of acceptance by the respondents on the developed Animal Identification and Records Monitoring Tool using RFID. The criteria of acceptance were limited to functionality, reliability, usability, and performance.

Likert scale was used to describe the quantified responses of the respondents.

TABLE 1: Likert Scale for Verbal Interpretation.

Rating	Numerical Scale	Level of Acceptance Verbal Interpretation
5	4.50 – 5.00	Highly Acceptable
4	3.50 – 4.49	Acceptable
3	2.50 – 3.49	Moderately Acceptable
2	1.50 – 2.49	Less Acceptable
1	1.00 – 1.49	Not Acceptable

The research was largely qualitative-quantitative method in describing and interpreting the nature present and existing situation of the proposed system. Thus, this study was a descriptive research. Descriptive research involves the collection of data in order to test hypothesis and...to answer questions concerning current status of the subject of the study (Sevilla, 1992).

The respondents of the study were one (1) Animal Care specialist representative, one (1) Pretty PAWS representative, five (5) veterinarian representatives and eighty (80) pet owners from different places. All of them were selected through purposive sampling. Based on Crossman (2017) a purposive sample is a non-probability sample that is selected based on characteristics of a population and the objective of the study.

### 3. Results and Discussion

#### 3.1. The problems encountered in conducting manual tagging for animal

During the interview, the proponents shared four (4) issues in conducting manual tagging for animal namely: 1) traditional animal tag may cause death to some animals; 2) it may cause animal diseases and injuries; 3) the ID tag was prone to error and confusion; and 4) difficulty in maintaining records of vaccination, medication health check-ups using animal tagging.

#### 3.2. Respondents' response for appropriate features to be developed to address the problems encountered

The appropriate features of the tool that can be developed to address the problems encountered were: 1) RFID can make the process of animal tagging faster and easier; and 2) online scheduling and identification of pets in pet clinics are more convenient to use for both pet owners and veterinarians rather than the manual **process**

#### 3.3. Respondents' level of acceptance toward the developed tool

##### 3.3.1. Functionality

Table 2 shows the respondents' level of acceptance in terms of the functionality of AIRMTR. Data is well structured than in paper based with the weighted mean of 4.71 (highly acceptable); data sheets/charts is always available, 4.68 (highly acceptable); the sequence of operation is easy to understand, 4.61 (highly acceptable); data is not easily altered by an unauthorized user, 4.48 (acceptable); and data is secured with the use of passwords and usernames, 4.64 (highly acceptable).

In information technology, functionality is important in summing up on what a device can do for a user. A product's functionality is used by marketers to identify product

TABLE 2: Respondents’ Level of Acceptance in terms of the Functionality of AIRMTR.

Statement	Mean Response	Interpretation	Rank
Data is well structured than in paper based	4.71	Highly Acceptable	1
Data sheets/charts is always available	4.68	Highly Acceptable	2
The sequence of operation is easy to understand	4.61	Highly Acceptable	4
Data is not easily altered by an unauthorized user.	4.48	Acceptable	5
Data is secured with the use of passwords and usernames.	4.64	Highly Acceptable	3
<b>Overall Mean</b>	<b>4.62</b>	<b>Highly Acceptable</b>	

features and enables a user to have a set of capabilities (Rouse, 2017). AIRMTR is highly acceptable by the respondents in terms of the functionality. This is obtained from the overall mean assessment of 4.63. Thus, this system may gain higher level of marketability.

### 3.3.2. Reliability

TABLE 3: Respondents’ Level of Acceptance in Terms of the Reliability of AIRMTR.

Statement	Mean Response	Interpretation	Rank
Software provides accurate results.	4.46	Acceptable	5
Capability of the software to provide the right or agreed results consistently (ex. Computation)	4.43	Acceptable	6
The system provides good visualization based on the given polarity.	4.61	Highly Acceptable	1
System can be help for decision making process.	4.57	Highly Acceptable	2.5
<b>Overall Mean</b>	<b>4.52</b>	<b>Highly Acceptable</b>	

Table 3 shows the respondents’ level of acceptance in terms of the reliability of AIRMTR. It indicates that the software provides accurate results with the weighted

mean 4.46 (acceptable); capability of the software to provide the right or agreed results consistently, 4.43 (acceptable); the system provides good visualization based on the given polarity, 4.61 (highly acceptable); and system can be help for decision making process, 4.57 (highly acceptable).

According to Weibull.com (2013), once the reliability of a system has been determined, developers are often faced with the task of identifying the components that cause the most problems to the system in order to prioritize improvements in the design and channel resources and efforts of system improvement to the areas that will have the most impact on the system’s performance. Reliability is one of the factors taken into consideration to determine the best way to achieve system’s goal to fit with the user’s components.

The system is highly acceptable to the respondents in terms of the reliability. This is obtained from the overall mean assessment of 4.52.

### 3.3.3. Usability

TABLE 4: Respondents’ Level of Acceptance in Terms of the Usability of AIRMTR.

Statement	Mean Response	Interpretation	Rank
The environment is user-friendly	4.71	Highly Acceptable	2
Browsing and navigation is easy to operate	4.79	Highly Acceptable	1
Formats of different modules are consistent and uniform (reports, chart, etc.)	4.54	Highly Acceptable	4
Texts and graphical representations is easy to understand	4.68	Highly Acceptable	3
<b>Overall Mean</b>	4.68	<b>Highly Acceptable</b>	

Table 4 shows the respondents’ level of acceptance in terms of the usability of AIRMTR. It indicates that the environment is user-friendly with the weighted mean, 4.71 (highly acceptable); browsing and navigation are easy to operate, 4.79 (highly acceptable); formats of different modules are consistent and uniform, 4.54 (highly acceptable); and texts and graphical representations is easy to understand, 4.68 (highly acceptable). Britsios (2017) once mentioned that usability is the measure of the quality of a user’s experience when interacting with a product or system. He added

that users will be satisfied, not frustrated, with the product; will enjoy interacting with the product; will achieve their goals effectively and efficiently; and will cultivate confidence and trust in the product. The system is highly acceptable to the respondents in terms of the usability. This is obtained from the overall mean assessment of 4.68.

### 3.3.4. Performance

TABLE 5: Respondents' Level of Acceptance Regarding the Performance of AIRMTR.

Statement	Mean Response	Interpretation	Rank
There is acceptable response and processing time	4.50	Highly Acceptable	4
Data retrieval should be fast and easy	4.64	Highly Acceptable	1.5
Capable of completing several tasks in a certain period of time	4.64	Highly Acceptable	1.5
<b>Overall Mean</b>	<b>4.59</b>	<b>Highly Acceptable</b>	

Table 5 shows the respondents' level of acceptance regarding the performance of AIRMTR. It indicates that there is acceptable response and processing time with the weighted mean of 4.50 (highly acceptable); data retrieval should be fast and easy, 4.64 (highly acceptable); and capable of completing several tasks in a certain period of time, 4.64 (highly acceptable).

Performance ensures that the roles, skills, activities, practices, tools and deliverables are applied at every phase of the application. It guarantees the project will be designed, implemented and operationally supported to meet desired requirements (Cover & Tomas, 2016).

The system is highly accepted by the respondents in terms of performance. This is obtained from the overall mean assessment of 4.59.

## 4. Conclusion and Recommendation

### 4.1. Conclusions

1. The problems encountered in conducting tagging for animal clinic were traditional animal tag may cause death to some animals; animal diseases and injuries by



animal tagging; duplication and confusion in using animal tagging; and difficulty in maintaining records of vaccination, medication health check-ups using animal tagging.

2. The appropriate features of the tool that can be developed to address the problems encountered were: RFID can make the process of animal tagging faster and easier; and online scheduling and identification of pets in pet clinics are more convenient to use for both pet owners and veterinarians rather than the manual process
3. The respondents' ratings for Animal Identification and Record Monitoring Tool using RFID were *highly acceptable* in terms of functionality (4.62); reliability (4.52); usability (4.68); and performance (4.59).

## 4.2. Recommendations

1. The government agencies may suggest that animals should be tagged using the developed system for monitoring purposes.
2. Further research on Internet controlled devices may be conducted other than stand-alone offline software programs.
3. This study may also be developed considering the following features: UHF as a tracking device for animals; individual registered users to make page where the client can edit, rate and price; displaying hex value using LCD; access to the shop's system to be validated; contraction number of the project with logo and clinic's validation.

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## References

- [1] Britsios, J. (2017). Webnauts.net. Retrieved from Why usability is important to you: <http://www.webnauts.net/usability.html>
- [2] Crossman, A. (2017, March 02). thoughtco. Retrieved from Understanding Purposive Sampling: An Overview of the Method and Its Applications: <https://www.thoughtco.com/purposive-sampling-3026727>
- [3] Rouse, M. (2017). searchmicroservices.techtarget. Retrieved from functionality: <http://searchmicroservices.techtarget.com/definition/functionality>
- [4] Sevilla, C. G. (1992). Research Methods: Revised Edition. Quezon City: Rex.
- [5] Thomas M. Cover, Joy A. Thomas (2006). Elements of Information Theory. John Wiley & Sons, New York.
- [6] Weibull. (2013, March). Retrieved from Reliability Importance: <http://www.weibull.com/hotwire/issue145/tooltips145.htm>
- [7] Zikmund, W. G. (2003). Business Research Methods. Ohio: Thomson South-Western