

DAFTAR ISI

LEMBAR PENGESAHAN

LEMBAR PERNYATAAN ORISINALITAS

ABSTRAK **iv**

KATA PENGANTAR **vi**

UCAPAN TERIMA KASIH **vii**

DAFTAR ISI **ix**

DAFTAR GAMBAR **xii**

DAFTAR TABEL **xiv**

DAFTAR ACHIEVEMENT **xv**

DAFTAR SINGKATAN **xv**

DAFTAR LAMPIRAN **xv**

I PENDAHULUAN **1**

1.1 Latar Belakang 1

1.2 Rumusan Masalah 2

1.3 Tujuan dan Manfaat 3

1.4 Batasan Masalah 3

1.5 Metode Penelitian 4

1.6 Sistematika Penulisan 5

| | | |
|------------|--|-----------|
| II | TINJAUAN PUSTAKA | 6 |
| 2.1 | Kesehatan Paru-paru | 6 |
| 2.2 | Kondisi Kesehatan Paru-paru | 6 |
| 2.3 | <i>Internet of Things</i> | 7 |
| 2.4 | NodeMCU ESP 8266 | 7 |
| 2.5 | Sensor warna TCS3200 | 8 |
| 2.6 | Sensor Suhu DS18B20 | 9 |
| 2.7 | Sensor Piezoelektrik | 9 |
| 2.8 | <i>RESTful Web Service</i> | 10 |
| 2.9 | <i>Fuzzy Logic</i> | 10 |
| 2.9.1 | <i>Fuzzyfication</i> | 11 |
| 2.9.2 | <i>Inference</i> | 14 |
| 2.9.3 | <i>Deffuzification</i> | 14 |
| 2.9.4 | Alasan menggunakan Fuzzy Logic | 15 |
| 2.10 | <i>Quality of Service</i> | 15 |
| 2.10.1 | <i>Delay</i> | 15 |
| 2.10.2 | <i>Throughput</i> | 16 |
| 2.11 | <i>Android Studio</i> | 16 |
| 2.12 | <i>Firebase</i> | 17 |
| III | PERANCANGAN DAN SIMULASI SISTEM | 19 |
| 3.1 | Desain Sistem | 19 |
| 3.2 | Rangkaian Skematik | 20 |
| 3.3 | Diagram Blok | 20 |
| 3.4 | Desain Perangkat Keras | 21 |
| 3.5 | Desain Perangkat Lunak | 24 |
| 3.6 | Flowchart Sistem | 24 |
| 3.7 | <i>Flowchart Fuzzy Logic</i> | 25 |
| 3.8 | Perancangan Fuzzy Logic | 26 |

| | | |
|-----------|-------------------------------------|-----------|
| 3.8.1 | <i>Fuzzification</i> | 27 |
| 3.8.2 | <i>Inference</i> | 29 |
| 3.8.3 | Defuzzification | 31 |
| 3.9 | Skenario Pengujian | 32 |
| IV | HASIL DAN ANALISIS | 33 |
| 4.1 | Pengujian Sensor DS18B20 | 33 |
| 4.2 | Pengujian TCS3200 | 33 |
| 4.3 | Pengujian Sensor Piezoelektrik | 35 |
| 4.4 | Pengujian Prototype | 36 |
| 4.5 | Pengujian Fuzzy Logic | 37 |
| 4.6 | Pengujian <i>Quality of Service</i> | 38 |
| 4.6.1 | Pengujian Delay | 39 |
| 4.6.2 | Pengujian Throughput | 40 |
| V | KESIMPULAN DAN SARAN | 43 |
| 5.1 | Kesimpulan | 43 |
| 5.2 | Saran | 44 |
| | DAFTAR PUSTAKA | 45 |