**LAPORAN TUGAS AKHIR**

**PEMANTAUAN SUHU DAN KELEMBABAN RUANGAN**

**SENSOR *DIGITAL HUMIDITY AND TEMPERATURE***

**Mata Kuliah Internet of Things**

HALAMAN JUDUL LUAR

****

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**Universitas Multi Data Palembang**

**Palembang**

**2024**

# ABSTRAK

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**Keywords**:

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Kata pengatar

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# PENDAHULUAN

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## Tujuan

Dalam penelitian ini ditentukan ruang lingkup atau batasan masalah sebagai berikut:

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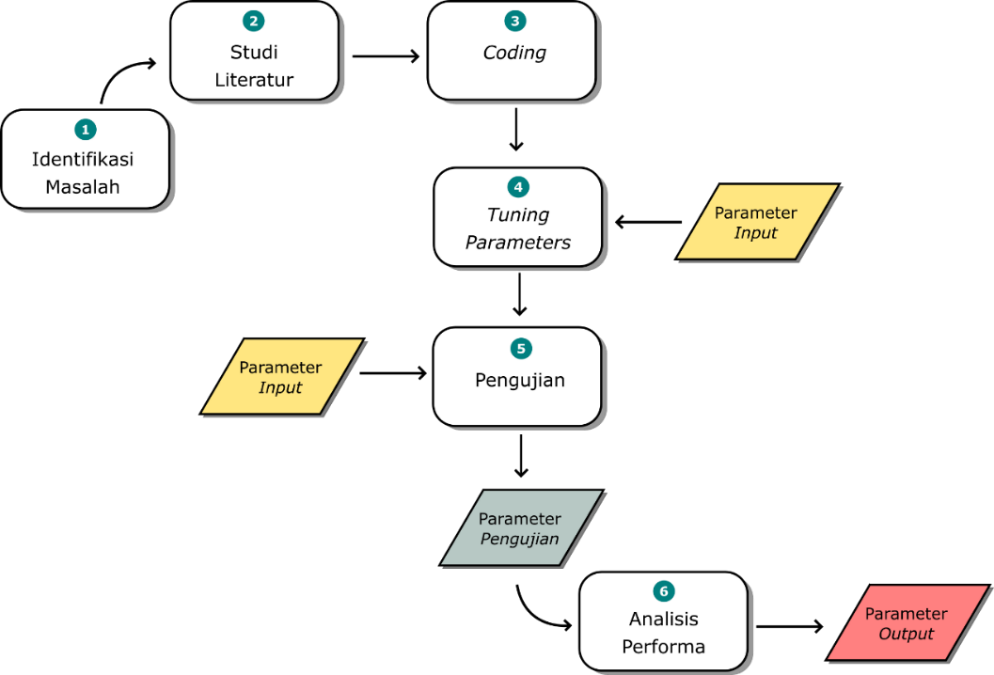
## Manfaat

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## Ruang Lingkup Proyek

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Gambar 1.1 Metodologi Penelitian

Jika menaruh gambar ataupun tabel pada laporan, pastikan ada kalimat keterangan untuk gambar ataupun tabel tersebut. Tidak perlu menulis gambar di atas atau gambar di bawah, cukup tulis nomor gambarnya saja, seperti Gambar 1.1 merupakan contoh dari suatu bagan lorem ipsum, Gambar 1.1 menjelaskan lokasi tempat pengambilan data yang beralamat di Lorem Ipsum. Lorem ipsum dolor sit amet, consectetur adipiscing elit Gambar 1.1, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat:

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# TINJAUAN PUSTAKA

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## NodeMCU

NodeMCU adalah.

Versi 3 NodeMCU menggunakan modul ESP-12E (ESP8266MOD) dan merupakan papan pengembangan yang mudah digunakan dengan pin analog dan digital, adapter *universal serial bus* (USB) ke *serial* dengan modul CH340g, dan soket *micro* USB <https://loginov-rocks.medium.com/quick-start-with-nodemcu-v3-esp8266-arduino-ecosystem-and-platformio-ide-b8415bf9a038>.

## Sensor *Digital Humidity and Temperature*

AAAA

## *Buzzer*

AAA

## Kabel *Jumper*

AAA

## Kabel USB

AAA

## *Power Bank*

AAA

## Visual Studio Code

Visual Studio Code

*Extension* PlatformIO pada Visual Studio Code digunakan untuk pembangunan perangkat lunak untuk perangkat ESP8266.

## *Arduino*

*Multi-objective problem* adalah permasalahan yang memiliki lebih dari satu fungsi tujuan yang harus dicapai untuk menyelesaikan masalah tersebut(de Oliveira, Freitas, & Tinós, 2018; Lei dkk., 2018). Nilai dari seluruh fungsi tujuan tersebut haruslah dapat dioptimalkan oleh suatu algoritma dalam proses eksekusi. *Evolutionary algorithm* seperti *genetic algorithm* telah menjadi algoritma utama untuk memecahkan masalah *multi-objective problem* dalam dekade akhir ini (Akkan & Gülcü, 2018).

## Firebase

*Genetic Algorithm* (GA) merupakan *evolutionary algorithm* yakni algoritma dengan metode heuristik yang dikembangkan berdasarkan konsep evolusi dalam biologi (Yousef dkk., 2016). Tahapan dari algoritma ini dapat dilihat pada Gambar 2.1. cepteur sint occaecat cupidatat non proident, sunt in Lorem ipsum dolor sit amet.

## React

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# METODE

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## Perangkat yang Digunakan

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### Perangkat Keras (*Hardware*)

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1. **NodeMCUv3**

AAAAA

1. **Sensor *Digital Humidity and Temperature***

AAAA

1. ***Buzzer***

AAAA

1. **Kabel *Jumper***

AAA

1. **Kabel USB**

AA

1. ***Power Bank***

AA

### Perangkat Lunak (*Software*)

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1. **Visual Studio Code**

AAA

1. **Firebase**

AAAA

1. **React**

AAAAAAA

## Pembangunan Perangkat

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### Pembangunan Perangkat Keras

AAAa

### Penggunaan Arduino

AAA

### Penggunaan Firebase

AAA

### Pembangunan Aplikasi Berbasis Web

## Cara Kerja Perangkat

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# HASIL PENGUJIAN

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## Hasil Pengujian

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Tabel 4.3 Hasil Pengujian FGA Skenario 20 Individu Semester Gasal

| **No** | **Generasi Jadwal Terbaik** | **Pelanggaran HC Jadwal Terbaik** | **Pelanggaran SC Jadwal Terbaik** | **Fitness Jadwal Terbaik** | **Waktu Eksekusi** |
| --- | --- | --- | --- | --- | --- |
| **1** | 808 | 7 | 18 | 0,008 | 5673 |
| **2** | 941 | 6 | 12 | 0,01031 | 4676 |
| **3** | 994 | 6 | 20 | 0,00826 | 4550 |
| **4** | 982 | 8 | 20 | 0,00709 | 4540 |
| **5** | 581 | 7 | 15 | 0,00862 | 4556 |
| **6** | 557 | 6 | 14 | 0,00971 | 4681 |
| **7** | 941 | 3 | 18 | 0,01176 | 4708 |
| **8** | 773 | 5 | 18 | 0,00952 | 5394 |
| **9** | 922 | 7 | 19 | 0,00781 | 4749 |
| **10** | 968 | 4 | 16 | 0,01124 | 4742 |
| **11** | 983 | 6 | 12 | 0,01031 | 4752 |
| **12** | 748 | 7 | 14 | 0,00885 | 4768 |
| **13** | 977 | 7 | 15 | 0,00862 | 5064 |
| **14** | 511 | 7 | 11 | 0,00962 | 4534 |
| **15** | 846 | 5 | 21 | 0,00877 | 4544 |
| **16** | 847 | 5 | 14 | 0,01075 | 4677 |
| **17** | 878 | 8 | 15 | 0,00794 | 4688 |
| **18** | 949 | 6 | 16 | 0,00917 | 4761 |
| **19** | 767 | 8 | 17 | 0,00758 | 4670 |
| **20** | 972 | 4 | 17 | 0,01087 | 4687 |
| **21** | 841 | 5 | 17 | 0,0098 | 4579 |
| **22** | 161 | 7 | 22 | 0,0073 | 4540 |
| **23** | 897 | 6 | 20 | 0,00826 | 4685 |
| **24** | 970 | 6 | 16 | 0,00917 | 4674 |
| **25** | 464 | 7 | 17 | 0,0082 | 4683 |
| **26** | 720 | 5 | 21 | 0,00877 | 4698 |
| **27** | 881 | 5 | 16 | 0,0101 | 4675 |
| **28** | 803 | 5 | 13 | 0,01111 | 4556 |
| **29** | 733 | 4 | 17 | 0,01087 | 4682 |
| **30** | 989 | 8 | 21 | 0,00694 | 4680 |
| **31** | 981 | 5 | 16 | 0,0101 | 4701 |
| **32** | 879 | 6 | 20 | 0,00826 | 4758 |
| **33** | 977 | 3 | 19 | 0,01136 | 4579 |
| **34** | 977 | 8 | 13 | 0,00833 | 4581 |
| **35** | 729 | 5 | 16 | 0,0101 | 4669 |
| **36** | 619 | 4 | 22 | 0,00935 | 4675 |
| **37** | 940 | 7 | 19 | 0,00781 | 4677 |
| **38** | 978 | 8 | 13 | 0,00833 | 4701 |
| **39** | 942 | 5 | 19 | 0,00926 | 4701 |
| **40** | 990 | 4 | 21 | 0,00962 | 4579 |
| **41** | 799 | 7 | 15 | 0,00862 | 4555 |
| **42** | 996 | 3 | 19 | 0,01136 | 4691 |
| **43** | 879 | 6 | 16 | 0,00917 | 4679 |
| **44** | 574 | 6 | 16 | 0,00917 | 4692 |
| **45** | 940 | 5 | 20 | 0,00901 | 4580 |
| **46** | 522 | 5 | 17 | 0,0098 | 4551 |
| **47** | 439 | 5 | 20 | 0,00901 | 4677 |
| **48** | 843 | 5 | 17 | 0,0098 | 4673 |
| **49** | 900 | 9 | 14 | 0,00752 | 4673 |
| **50** | 895 | 4 | 20 | 0,0099 | 4688 |
| **Minimum** | **161** | **3** | **11** | **0,00694** | **4534** |
| **Rata-Rata** | **824,06** | **5,8** | **17,08** | **0,009224** | **4698,92** |
| **Maksimum** | **996** | **9** | **22** | **0,01176** | **5673** |

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Tabel 4.4 Hasil Pengujian GA Skenario 20 Individu Semester Gasal

| **No** | **Generasi Jadwal Terbaik** | **Pelanggaran HC Jadwal Terbaik** | **Pelanggaran SC Jadwal Terbaik** | **Fitness Jadwal Terbaik** | **Waktu Eksekusi** |
| --- | --- | --- | --- | --- | --- |
| **1** | 864 | 0 | 7 | 0,04545 | 4215 |
| **2** | 716 | 0 | 8 | 0,04 | 3205 |
| **3** | 787 | 0 | 9 | 0,03571 | 3165 |
| **4** | 901 | 0 | 8 | 0,04 | 3163 |
| **5** | 877 | 0 | 6 | 0,05263 | 3228 |
| **6** | 750 | 0 | 5 | 0,0625 | 3211 |
| **7** | 910 | 0 | 6 | 0,05263 | 3181 |
| **8** | 981 | 0 | 7 | 0,04545 | 3174 |
| **9** | 892 | 1 | 9 | 0,02632 | 3166 |
| **10** | 844 | 0 | 9 | 0,03571 | 3174 |
| **11** | 696 | 0 | 9 | 0,03571 | 3173 |
| **12** | 785 | 0 | 5 | 0,0625 | 3169 |
| **13** | 836 | 0 | 7 | 0,04545 | 3169 |
| **14** | 801 | 0 | 7 | 0,04545 | 3193 |
| **15** | 884 | 0 | 7 | 0,04545 | 3254 |
| **16** | 925 | 0 | 9 | 0,03571 | 3191 |
| **17** | 745 | 1 | 8 | 0,02857 | 3172 |
| **18** | 698 | 1 | 5 | 0,03846 | 3174 |
| **19** | 798 | 0 | 7 | 0,04545 | 3159 |
| **20** | 790 | 0 | 8 | 0,04 | 3150 |
| **21** | 830 | 0 | 8 | 0,04 | 3160 |
| **22** | 803 | 0 | 12 | 0,02703 | 3155 |
| **23** | 876 | 0 | 7 | 0,04545 | 3199 |
| **24** | 938 | 0 | 7 | 0,04545 | 3246 |
| **25** | 754 | 0 | 5 | 0,0625 | 3215 |
| **26** | 720 | 0 | 6 | 0,05263 | 3176 |
| **27** | 830 | 1 | 3 | 0,05 | 3159 |
| **28** | 954 | 0 | 7 | 0,04545 | 3152 |
| **29** | 959 | 0 | 3 | 0,1 | 3173 |
| **30** | 362 | 0 | 4 | 0,07692 | 3176 |
| **31** | 702 | 0 | 7 | 0,04545 | 3213 |
| **32** | 646 | 0 | 7 | 0,04545 | 3249 |
| **33** | 780 | 0 | 8 | 0,04 | 3171 |
| **34** | 870 | 0 | 6 | 0,05263 | 3187 |
| **35** | 929 | 0 | 4 | 0,07692 | 3176 |
| **36** | 687 | 0 | 6 | 0,05263 | 3156 |
| **37** | 844 | 0 | 8 | 0,04 | 3152 |
| **38** | 987 | 0 | 6 | 0,05263 | 3232 |
| **39** | 874 | 0 | 9 | 0,03571 | 3218 |
| **40** | 750 | 0 | 9 | 0,03571 | 3323 |
| **41** | 982 | 0 | 4 | 0,07692 | 3187 |
| **42** | 826 | 0 | 6 | 0,05263 | 3164 |
| **43** | 985 | 0 | 5 | 0,0625 | 3163 |
| **44** | 890 | 0 | 3 | 0,1 | 3167 |
| **45** | 473 | 0 | 9 | 0,03571 | 3165 |
| **46** | 943 | 0 | 4 | 0,07692 | 3143 |
| **47** | 831 | 0 | 8 | 0,04 | 3184 |
| **48** | 925 | 0 | 7 | 0,04545 | 3244 |
| **49** | 997 | 0 | 7 | 0,04545 | 3184 |
| **50** | 954 | 0 | 6 | 0,05263 | 3182 |
| **Minimum** | **362** | **0** | **3** | **0,02632** | **3143** |
| **Rata-Rata** | **827,62** | **0,08** | **6,74** | **0,049398** | **3207,14** |
| **Maksimum** | **997** | **1** | **12** | **0,1** | **4215** |

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# PENUTUP

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