The database consists of two full datasets. The first dataset is the collection of 20 records gathered from 14 OSA patients as part of the Apnea-ECG Database. The second dataset consists of 10 records from 10 subjects, who were selected based on the quality of the signals, from St. Vincent’s University Hospital/ University College Dublin (UCD Database) sleep apnea database (http://www.physionet.org/pn3/ucddb/). The OSA annotations are in minute-wise scored offline by experienced sleep physicians using polysomnography (PSG) signals. The PSG signals recorded were EEG, EOG, EMG, ECG, nasal airflow, ribcage movements, abdomen movements, oxygen saturation (finger pulse oximeter), snoring (tracheal microphone), and body position. All subjects have been clinically diagnosed with mild to severe OSA. The baseline characteristics of the patients from these two datasets are summarized in Table 1.

The first source of data are 20 recordings gathered from 14 sleep apnea patient as part of the Apnea-ECG Database- Physionet (<http://physionet.org/physiobank/database/apnea-ecg/>). All subjects have been clinically diagnosed to have moderate to severe sleep apnea diagnostic information summarized in Table S1. The recordings from each patient include one channel of ECG (gathered at 100 Hz sampling rate and 12-bit resolution), and respiration signals (nasal thermistors as well as chest and abdominal respiratory inductance plethysmography bands that were gathered synchronously with the ECG at a sampling rate of 20 Hz). The signals were collected for ~ 8 hr duration for up to two consecutive nights from each subject. Also included as part of the recording are a set of machine-generated QRS annotations and a minute-wise annotation of the presence or absence of an apnea (or hypoapnea) episode as provided by human experts based on offline polysomnographic (PSG) recordings.

The second source of data originates from St. Vincent’s University Hospital/ University College Dublin (UCD database) sleep apnea database (<http://www.physionet.org/pn3/ucddb/>). In this dataset, subjects were randomly selected over 6 month period from the patients with suspected sleep-disordered breathing. The ECG signals were gathered at 128 Hz sampling rate and 11-bit resolution. The apnea annotations were scored offline by experienced sleep physicians. The recordings from 10 subjects were selected based on the quality of the signals and the diagnostic information of patients from Apnea-ECG and UDC databases is summarized in Table S2.

Table 1. Baseline characteristics of the patients from Apnea-ECG database and St. Vincent’s University Hospital/ University College Dublin Database (UCD database).

|  |  |  |
| --- | --- | --- |
|  | **Apnea-ECG Dataset** | **UCD Dataset** |
| Measures (units) | Mean$\pm $SD | Mean$\pm $SD |
| No. of records/subjects | 20/14 | 10/10 |
| Age (yr) | 52.1±6.5 | 48.4±8.18 |
| BMI (kg/m2) | 31.2±5.1 | 30.92±2.88 |
| AHI (events/hr) | 47.7±20.1 | 23.2±16.4 |
| Study duration (min) | 503.1±25.1 | 415.2±26.5 |
| Apnea (min) | 312.5±116.9 | 129.3±110.3 |
| Non-apnea (min) | 190.6±111.4 | 285.9±96.7 |
| **BMI**: body mass index; **AHI**: apnea-hypoapnea index;**HI**: hypoapnea index; **AI**: apnea index |

*Table S1. Diagnostic information of the OSA patients from Apnea-ECG Database- Physionet*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Record** | **Patient ID** | **Sleep Duration (min)** | **Apnea****(min)** | **AI** | **HI** | **AHI** | **Age** | **Height****(cm)** | **Weight****(kg)** | **BMI** |
| a01 | p1 | 490 | 470 | 13 | 57 | 70 | 51 | 175 | 102 | 33.31 |
| a02 | p2 | 529 | 420 | 57 | 12 | 70 | 38 | 180 | 120 | 37.04 |
| a03 | p3 | 520 | 246 | 38 | 1 | 39 | 54 | 168 | 80 | 28.34 |
| a04 | p4 | 493 | 453 | 73 | 4 | 77 | 52 | 173 | 121 | 40.43 |
| a05 | p5 | 455 | 276 | 35 | 6 | 41 | 58 | 176 | 78 | 25.18 |
| a06 | p6 | 511 | 206 | 17 | 8 | 25 | 63 | 179 | 104 | 32.46 |
| a07 | p7 | 512 | 322 | 46 | 17 | 63 | 44 | 177 | 105 | 33.52 |
| a08 | p8 | 502 | 189 | 32 | 10 | 42 | 51 | 179 | 88 | 27.46 |
| a09 | p9 | 496 | 381 | 23 | 9 | 32 | 52 | 178 | 82 | 25.88 |
| a10 | p5 | 518 | 100 | 11 | 10 | 21 | 58 | 176 | 78 | 25.18 |
| a11 | p10 | 467 | 222 | 11 | 3 | 14 | 58 | 168 | 103 | 36.49 |
| a12 | p4 | 578 | 534 | 70 | 10 | 80 | 52 | 173 | 121 | 40.43 |
| a13 | p8 | 496 | 244 | 32 | 10 | 42 | 51 | 179 | 88 | 27.46 |
| a14 | p1 | 510 | 383 | 17 | 37 | 55 | 51 | 175 | 102 | 33.31 |
| a15 | p11 | 511 | 368 | 46 | 6 | 52 | 60 | 176 | 113 | 36.48 |
| a16 | p7 | 483 | 320 | 17 | 24 | 41 | 44 | 177 | 105 | 33.52 |
| a17 | p12 | 486 | 158 | 21 | 12 | 33 | 40 | 179 | 96 | 29.96 |
| a18 | p9 | 490 | 438 | 76 | 7 | 82 | 52 | 178 | 82 | 25.88 |
| a19 | p13 | 503 | 205 | 34 | 0 | 34 | 55 | 178 | 90 | 28.41 |
| a20 | p14 | 511 | 315 | 35 | 6 | 41 | 58 | 176 | 78 | 25.18 |
| **Average** | 503.05 | 312.50 | 35.20 | 12.47 | 47.67 | 52.10 | 176.00 | 96.80 | 31.30 |
| **StdDev** | 25.09 | 116.90 | 20.62 | 13.45 | 20.14 | 6.54 | 3.36 | 14.93 | 5.09 |

*Table S2. Diagnostic information of the OSA patients from St. Vincent’s University Hospital/ University College Dublin*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Patient ID | Study Duration (Min) | Apnea (Min) | AI | HI | AHI | Age | Height (cm) | Weight (kg) | BMI |
| 1 | UCDDB002 | 372 | 110 | 2 | 21 | 23 | 54 | 172 | 100.3 | 33.9 |
| 2 | UCDDB003 | 438 | 321 | 5 | 46 | 51 | 48 | 179 | 102 | 31.8 |
| 3 | UCDDB012 | 432 | 136 | 6 | 19 | 25 | 51 | 179 | 97.5 | 30.4 |
| 4 | UCDDB013 | 408 | 61 | 2 | 14 | 16 | 62 | 153 | 80 | 34.2 |
| 5 | UCDDB018 | 408 | 9 | 0 | 2 | 2 | 35 | 171 | 77 | 26.3 |
| 6 | UCDDB020 | 378 | 64 | 2 | 13 | 15 | 52 | 179 | 108.8 | 34 |
| 7 | UCDDB022 | 396 | 27 | 3 | 4 | 7 | 34 | 166 | 80.7 | 29.3 |
| 8 | UCDDB024 | 456 | 139 | 4 | 20 | 24 | 54 | 172 | 99.9 | 33.8 |
| 9 | UCDDB026 | 420 | 78 | 3 | 11 | 14 | 49 | 175 | 84 | 27.4 |
| 10 | UCDDB027 | 444 | 348 | 18 | 37 | 55 | 45 | 182 | 93 | 28.1 |