

ABSTRACT

**ANALYSIS OF FACIAL MORPHOLOGY THROUGH 3D IMAGE USING
MORPHOMETRIC GEOMETRIC METHOD**

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Background: Facial morphology analysis using geometric morphometric methods is considered more effective than conventional anthropometry. This method utilizes landmarks on 2D and 3D facial photographs which later will be processed in geometric morphometric software. The results of the process acquire superiority over conventional anthropometric methods, such as obtaining better results, detecting differences in the shape within little amount of sample, capturing information of the changing shape better, and visualizing the changes of shape as an illustration or computer animation directly. The application of craniofacial geometric morphometric analysis in the field of forensic anthropology is often used to identify race, age, and sex. **Purpose:** To provide an overview of the facial morphology analysis through 3D image using geometric morphometric method. **Methods:** Literature search through journal database for writing the literature review with descriptions related to facial morphology analysis, anatomical landmarks, 3D imaging devices, and geometric morphometric software. **Result:** After the selection, there were only 20 journals meeting the criteria that had been set where the 20 journals produced point of views of the overview of the facial morphology analysis through 3D image using geometric morphometric method according to landmarks, 3D imaging devices, and geometric morphometric software used. **Conclusion:** In accordance with the analysis of facial morphology, Landmarks generally used to illustrate facial morphology are right and left exocanthion, right left endocanthion, nasion, pronasale, right left chelion, and pogonion. The most common capturing tool of 3D facial photo in the analysis of facial morphology is 3D stereophotogrammetry. The geometric morphometric software regularly utilized are MorphoJ, Morphome3cs, R, PAST, Morphologika, Viewbox, Landmark, MorphoStudio, geomorph, Mathematica, Fidentis, MorphAnalyser.

Keyword: facial morphology analysis, anatomical landmarks, 3D imaging devices, and geometric morphometric software.

ABSTRAK**ANALISIS MORFOLOGI WAJAH MELALUI FOTO 3D
MENGUNAKAN METODE *GEOMETRIC MORPHOMETRIC*****ABSTRAK**

Latar Belakang: Analisis morfologi wajah melalui metode *geometric morphometric* dinilai lebih efektif daripada melalui antropometri konvensional. Metode ini menggunakan *landmarks* pada foto wajah 2D dan 3D yang nantinya akan diolah dalam *software geometric morphometric*. Hasil dari proses tersebut memiliki kelebihan dibandingkan metode antropometri konvensional yaitu, dapat memperoleh hasil yang lebih baik, dapat mendeteksi perbedaan bentuk dari sampel yang sedikit, menangkap informasi perubahan bentuk lebih baik, dan perubahan bentuk dapat divisualisasikan sebagai ilustrasi atau animasi komputer secara langsung. Aplikasi analisis *geometric morphometric* kraniofasial di bidang antropologi forensik sering digunakan untuk identifikasi ras, umur, dan jenis kelamin. **Tujuan:** Memberikan gambaran mengenai analisis morfologi wajah melalui foto 3D menggunakan metode *geometric morphometric*. **Metode:** Pencarian sumber pustaka melalui *database* jurnal untuk penyusunan karya tulis dengan deskripsi terkait analisis morfologi wajah, *anatomical landmarks*, alat pengambilan foto 3D, dan *software geometric morphometric*. **Hasil:** Setelah dilakukan seleksi, hanya ada 20 jurnal yang memenuhi kriteria yang telah ditetapkan. Dimana ke-20 jurnal menghasilkan gambaran mengenai analisis morfologi wajah melalui foto 3D menggunakan metode *geometric morphometric* berdasarkan *landmarks*, alat pengambilan foto 3D, dan *software geometric morphometric* yang digunakan. **Simpulan:** Pada analisis morfologi wajah, *Landmarks* yang dapat menggambarkan morfologi wajah dan sering digunakan yaitu, kanan kiri *exocanthion*, kanan kiri *endocanthion*, *nasion*, *pronasale*, kanan kiri *chelion*, dan *pogonion*. Alat pengambilan foto wajah 3D yang paling banyak digunakan dalam analisis morfologi wajah yaitu 3D *stereophotogrammetry*. Lalu *software geometric morphometric* yang dapat digunakan yaitu, MorphoJ, Morphome3cs, R, PAST, Morphologica, Viewbox, Landmark, MorphoStudio, geomorph, Mathematica, Fidentis, MorphAnalyser.

Kata Kunci: analisis morfologi wajah, *anatomical landmarks*, alat pengambilan foto 3D, *software geometric morphometric*.